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घटना  
चक्र

परीक्षा संवाद के 29 वर्ष

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2022

Pictorial Presentation...

# GS Dristhi

(6<sup>th</sup> in 7 Part Series)

One  
Trillion  
Trees by  
2050

Convention on  
Biological Diversity

Sustainable Development  
Goals (SDGs)

United Nations  
Climate Change

New York  
Declaration  
on Forests

To Support Life

People and  
Culture

Wildlife

Water

Climate

Forest  
Services &  
productive lands

At present we  
are losing net  
10 billion trees  
every year

How to reverse  
Deforestation

Regional Action

Local  
Initiatives

Departmental  
Change

Landscaping  
Initiative

Ending Deforestation

Improving Protection

Advancing Restoration

# Environment & Ecology

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परीक्षा संवाद के 29 वर्ष

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# Environment & Ecology

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## Preface

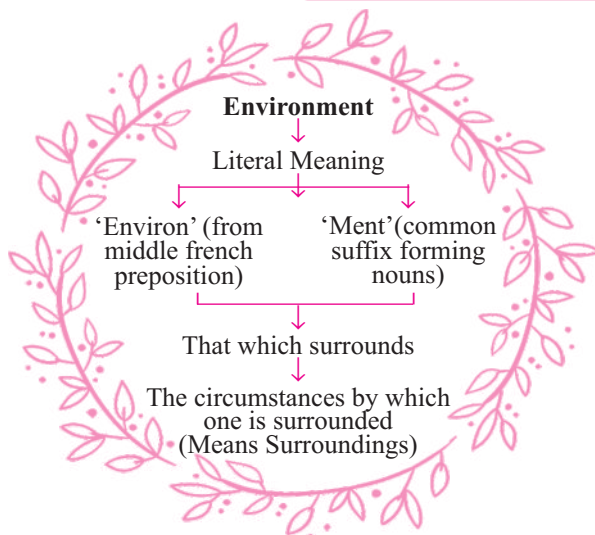
There are two main objectives of **Pictorial Presentation** of various subjects of **General Studies**. The **First One** - to gain confidence in studying the entire subjects in a short time. The **Other One** - these facts could be imprinted in the brain of the readers. Consequently the aspirants could remember the facts within no time in the examination hall. Our aim is that an aspirant could be able to solve at least two questions more from each topic because of imbibing this very effective pictorial representation.

**A good book is one that makes the reader feel and imbibe.** While presenting this subject matter, it has been kept in mind that only the important and relevant facts could get a place in this presentation along with no factual error at all. Moreover only the Purvavalokan related facts have been incorporated here. While presenting this book before the readers, we have worked hard to assay all key facts with government data and websites. Undoubtedly, we are in a position to say that there is 99.9 percent accuracy or above. This book is **well designed, handy, and appropriate for revision at the eleventh hours of the examination, appropriate design elements, a sense of originality.**

Despite all efforts to make this book very efficacious, if any doubt arises regarding facts, you all readers are always welcomed on our platform namely the **WHATSAPP platform**. You may WHATSAPP on mobile number **8081655444**. Your doubts will be resolved within 72 hours compulsorily.



## Environment & Sustainable Development



### According to Environment (Protection) Act (1986), the definition of Environment

the conditions by which organism is surrounded

Biotic & Abiotic components and their Interaction with each other

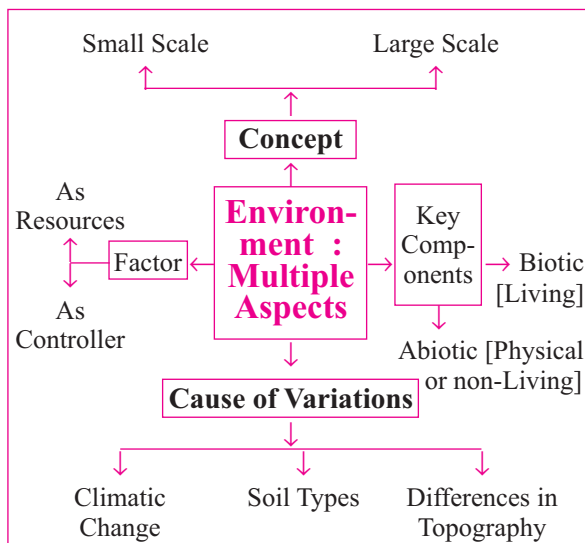
### General Definition

The group of land, water, air, plants & animals

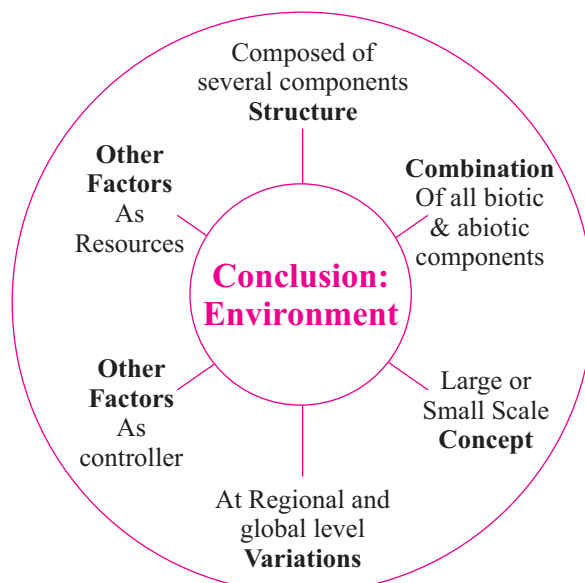
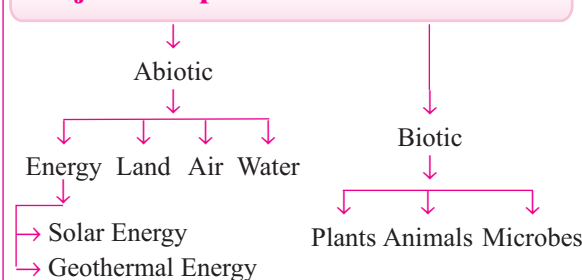
which surrounds us

are collectively called as

environment



### Major Components of Environment



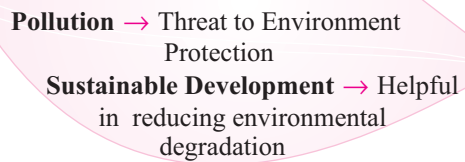


## Sustainable Development

### Sustainable Development

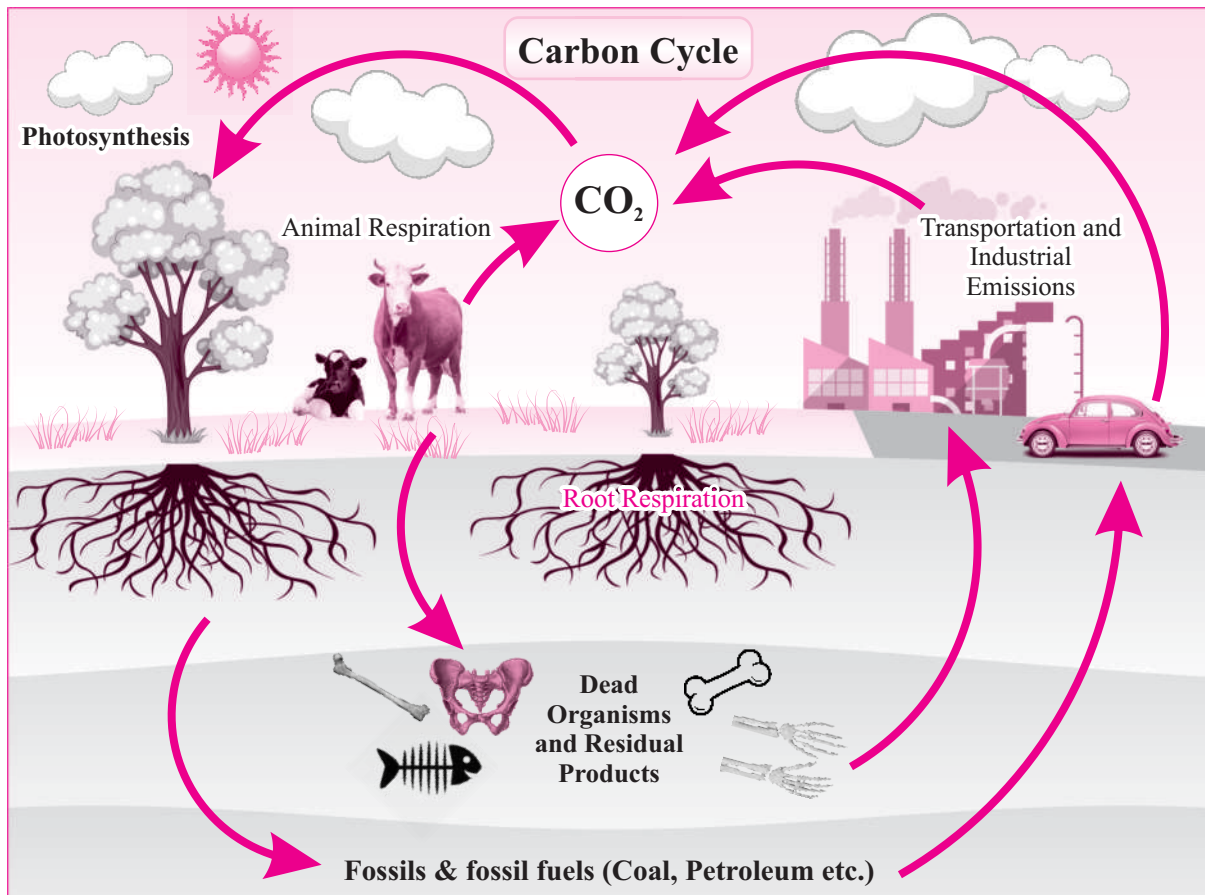
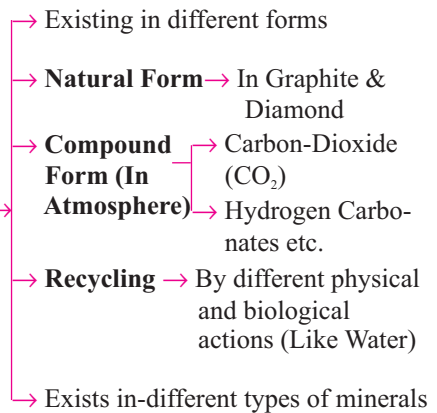


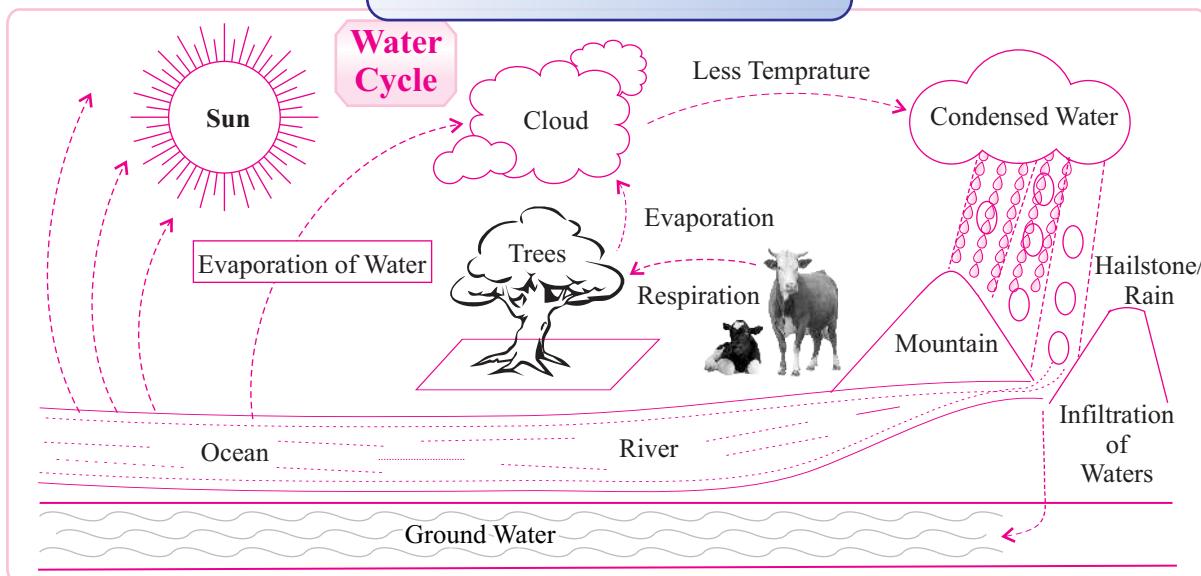
## Environmental Protection



## Water & Carbon Cycle in Nature

### Carbon



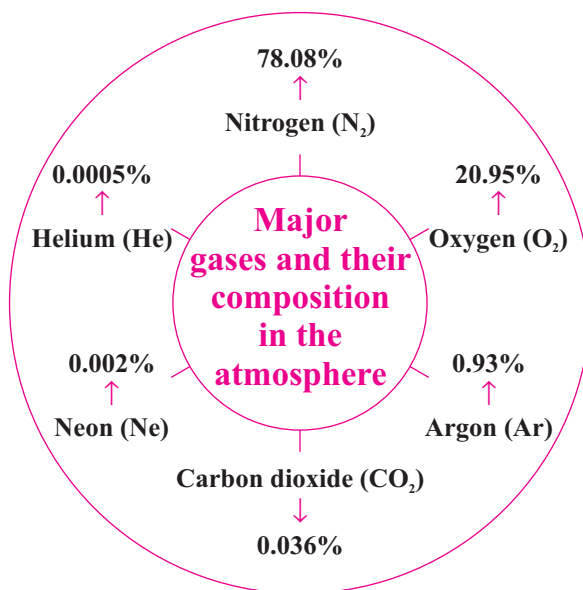
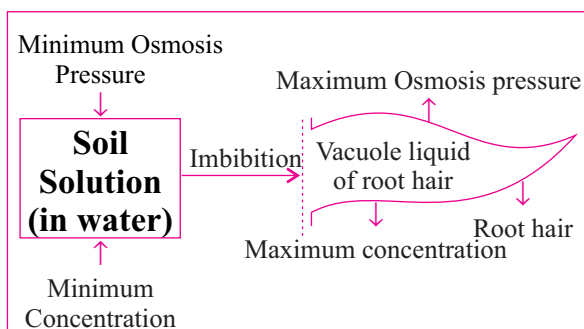


### Exam Vision

- It is helpful in the growth of plants  
-Water cycle
- It determines the amount of rainfall  
-Moisture in Atmosphere
- It indicates the various activities of water in the Hydrosphere  
-Water Cycle
- It maintains the balance of carbon element in the atmosphere  
-Carbon Cycle
- The cell wall of the root hair is mainly made of  
-By Cellulose,
- The reason for sticking of Root hairs to the soil is  
-Pectin
- The cell wall of root hairs performs the function like  
-Permeable Membrane

### Types of Substance

- ➔ **Element** ➔ The simplest form of substance in which the absence of subdivision by chemical or physical methods
- ➔ **Compound** ➔ Two or more elements combined in a constant ratio of mass
- ➔ **Mixture** ➔ Simple mixture of two or more elements or compounds in any ratio



### Atmosphere

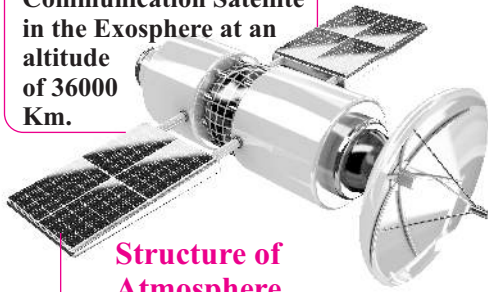
#### Definition

Mixture of gases (air) surrounding the earth

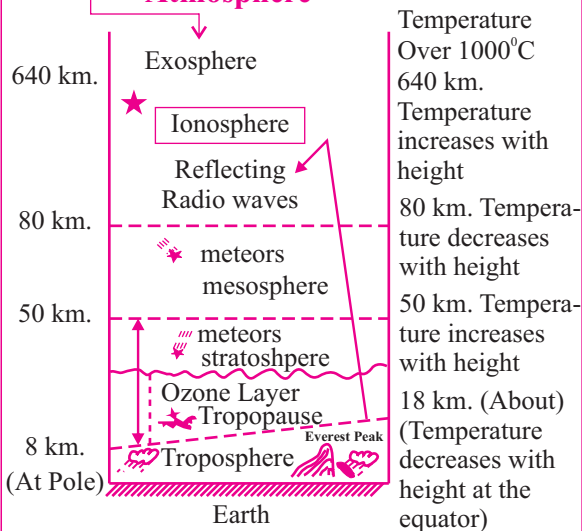
### Exam Vision

- That is helpful in maintaining the balance of Oxygen and Carbon dioxide in the atmosphere  
-Plants
- The other name for forests is  
-Green lungs

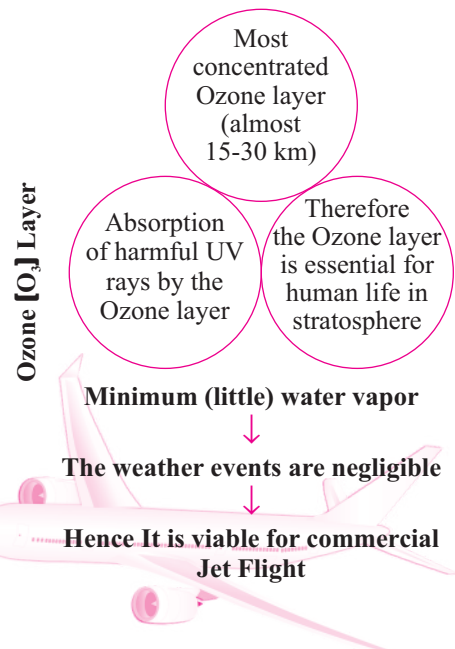
**Communication Satellite in the Exosphere at an altitude of 36000 Km.**



### Structure of Atmosphere



### Stratosphere



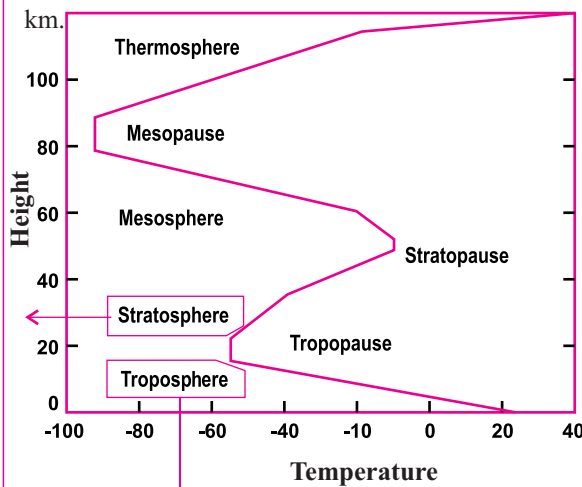
### Exam Vision

- Most of the formation of Ozone hole has been found **-Over Antarctica**
- Gases like CFC, Halogens, Nitrous Oxide, Ethane, Halon etc. are responsible **For depletion of Ozone layer**
- Chlorofluorocarbons, halons, carbon tetrachloride are **-Ozone Depleting Substances**
- It is related to the issue of controlling and phasing-out the use of ozone depleting substances **-Montreal Protocol**
- International Ozone day is observed for the protection of the Ozone layer on **-16 September**
- The Ozone hole was first detected over Antarctica in 1985 with the help of the 'Total Ozone Mapping Spectrometer' by **-British Antarctica Survey Team**
- A man-made substance made up of Chlorine, Fluorine and Carbon is. **-Chlorofluorocarbon**
- It is used as a cooling agent in refrigerators and air conditioning appliances **-Chlorofluorocarbon**

### Exam Vision

- Ozone levels in the stratosphere is naturally regulated **-By Nitrogen Dioxide**
- The thickness of the Ozone layer is mostly found in **- Spring Season**
- The Ozone layer is measured in **- Dobson unit**
- At 0°C and 1 Atmospheric [atm] pressure, the thickness of the pure Ozone layer of 0.01mm is equal to **- 1 Dobson Unit**
- Gas consisting of three atoms of oxygen is **-Ozone [O<sub>3</sub>]**
- Ozone gas in the form of the Ozone layer in the upper atmosphere protects life on Earth from the sun's ultraviolet radiation or ultraviolet rays, while it is above the surface of the ground that is, in the lower atmosphere **-A hazardous pollutant**
- It is primarily responsible for the Ozone layer **-Chlorofluorocarbon (CFC)**

## Stratification of the Atmosphere



The lowest layer of the Atmosphere

Almost all weather events (cloud, hail, fog, frost, cloud thunder, thunderstorm, storm, Lightning etc.) occur in the troposphere

There is decrease in temperature at the rate of  $6.5^{\circ}\text{C}$  per 1km with increasing altitude

### Exam Vision

- The group of gases around the Earth is called **-Atmosphere**
- If the vegetation (plants) found on the earth ends, then the gas which will be lacking is **-Oxygen ( $\text{O}_2$ )**

● The Amount of Nitrogen in dry Air is - **78.08%**

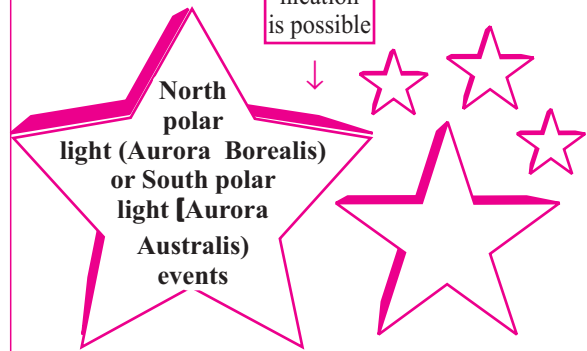
- The gas which has the largest amount in the air is **-Nitrogen ( $\text{N}_2$ )**
- It is found up to an altitude of 50-90 km from the ground **-Carbon dioxide**



## Ionosphere (Thermosphere)

Electrically Charged Particles  $+-$

Radio Waves Reflected to the Surface  
So wireless communication is possible

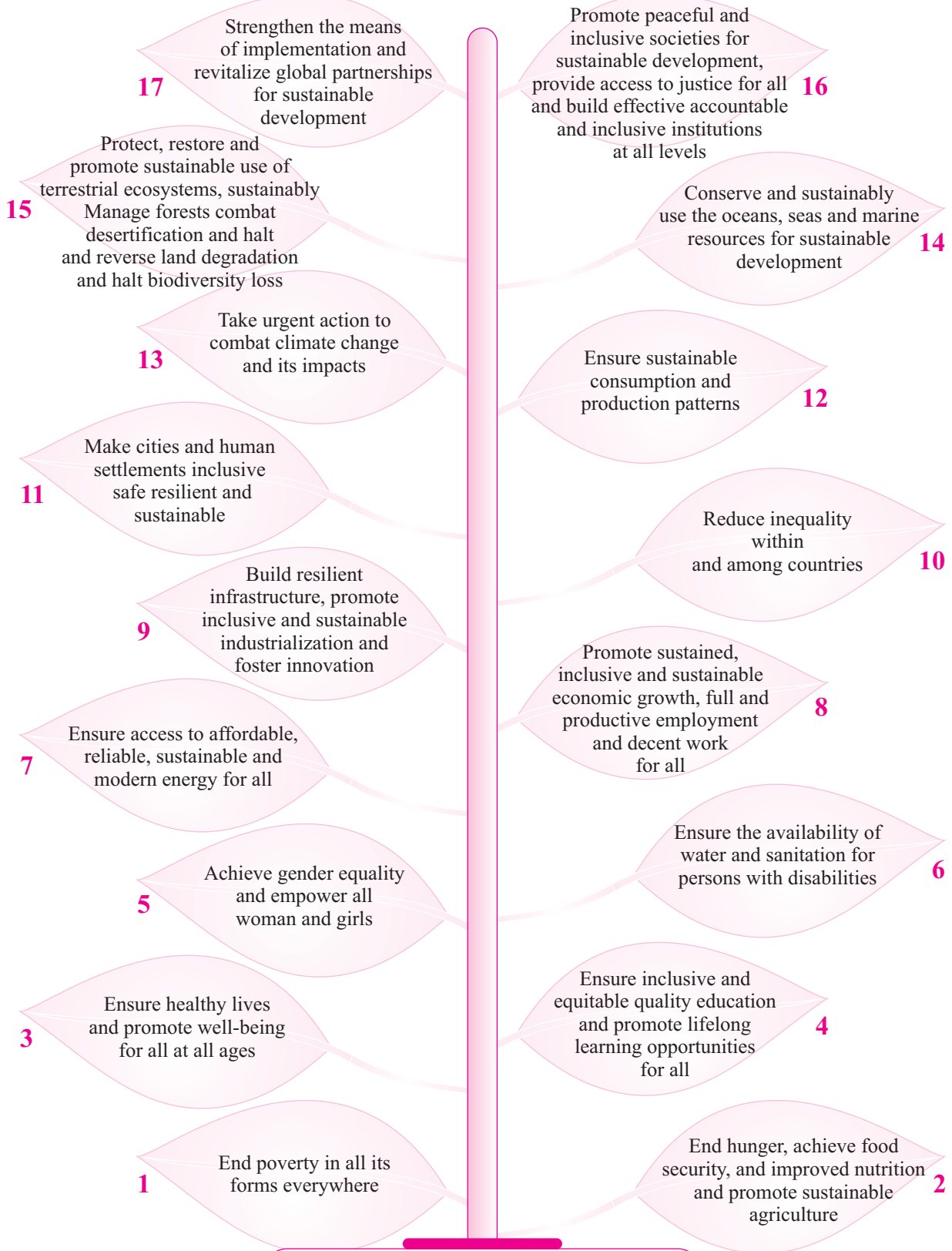


## Exam Vision

- There is a decrease in temperature per 1 km with increasing altitude in the troposphere **-  $6.5^{\circ}\text{C}$**
- Troposphere layer was named **-By Teisserenc-de-Bort**
- The height of the troposphere increases in the summer while in winter, it **- Decreases**
- Cirrus clouds are sometimes seen on the lower surface of the stratosphere. These clouds are called **- Mother of Pearl clouds**
- There is a sudden drop in temperature with altitude **- Mesosphere**
- D layer in the Ionosphere reflects **-Of low frequency radio waves**
- Kennelly Heaviside layer is called **- E layer**
- It is present in the 'E' layer of the Ionosphere **- Polar Light (Aurora light)**
- Helium, Argon, Radon, Neon are noble gases, out of these which gas is not found in air **- Radon**
- A substance in which two or more elements or compounds are simply mixed in any proportion is called **- Mixture**



## Sustainable Development



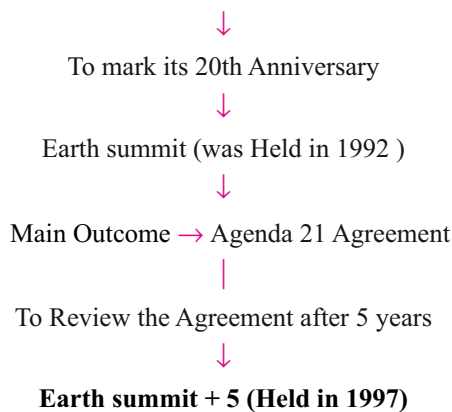
## 17 Sustainable Development Goals

## Earth Summit (Rio Summit)

### Exam Vision

- The International Earth summit a United Nations Conference on Environment development was held in 1992  
- **In Rio-De-Janeiro (Brazil)**
- Rio Earth summit, 1992 lead to establishment of - **Global Environment Facility (GEF)**
- Global Environment Facility Provides under-developed country funds to underdeveloped countries  
- **Under UNFCCC**
- A Global Action plan for sustainable development  
- **Agenda-21**
- Emphasizes on Eliminating Ecological destruction and Economic inequality  
- **Agenda-21**

### Stockholm Conference [1972]



## Rio Summit

Rio Summit 1992



Rio+5 or Earth Summit + 5 1997 New York



Rio + 20 Rio-de-Janerio (Brazil) June-2012



Rio + 10 Johannesburg, (South Africa) September-2002

Survey of Biodiversity and conservation of threatened organisms

Poverty alleviation and population control in developing countries

### Agenda-21

Emphasis on liberalizing capital transfer

Food, clean water and social security for all

## Acts Related to Environmental Protection

### N.G.T.

- **Full Name** → National Green Tribunal
- **Established** → 18 October, 2010 (By Indian Government)
- **Related Matters** →
  - Environmental Conservation and Forest Protection
  - Forest
  - Other natural resources, etc.

## Environment (Protection) Act, 1986

- Applicable to the Whole of India
- Other Name Umbrella act
- India's objective of passing the Act



Implementation of the decisions taken in the first UN Conference on the Human Environment (June 1972 in Stockholm)

## Various Organizations and Institutions



- **Full Name** → United Nation Environment Programme
- **Establishment Year** → 1972
- **Headquarters** → Nairobi (Kenya)

## NEERI

→ **Full Name** → National Environmental Engineering Research Institute

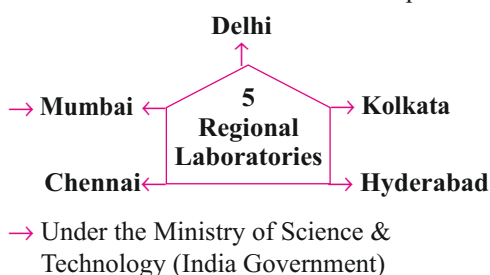
→ **Location** → Nagpur Maharashtra

→ **Founded in** → 1958

→ **Initial Name** → Central Public Health Engineering Research Institute [CPHERI]

→ **Purpose of its Establishment:**

- **Water Supply**
  - **Sewerage Plan**
  - **Industrial Pollution**
- Prevention → For Research & Development



## EPA

➤ **Full Name** → Environmental Protection Agency

➤ **Founded :** → 2 December 1970

➤ **Federal Agency** → United States of America

➤ **Relation** →

- Human Health
- Environment
- Related rules of → Infrastructure Enforcement

## Important Facts

- The World Meteorological Convention came into force on **- 23 March, 1950**
- The headquarters of the NGO Greenpeace International is located at **- Amsterdam (Netherland)**
- Genetic Engineering Appraisal Committee has been constituted **- Under Environment (Protection) Act, 1986**
- The true Index of Climate is **- Natural Vegetation**
- The plants which are found in water, in marshyland or on the banks of pond are called **- Water Loving plants (Hydrophytes)**
- It is certificate given to such Indian products, that are Environment friendly **- Ecomark (Effective since 1991)**
- The author of the book "Green Development : Environment & Sustainability in a Developing World" is **- W.M. Adams**
- Author of the book "Civilization and Climate" is **- Ellsworth Huntington**
- The innovator of Natural Agriculture is **- Masanobu Fukuoka**

## National Environment Authority (NEA)

● **Full Name** → National Environment Appellate Authority [NEAA]

● **Constitution** → By Ministry of Environment & Forest

● **Establishment** → Under the National Appellate Authority Act, 1997

● **Objectives** → To hear appeals with respect to restriction of areas in which any industry; operations or processes or class of industries, operations or processes under the Environment Protection Act, 1986.

## WMO

● **Full Name** → World Meteorological Organization

● **Specialised Agency** → Of United Nation

● **Mandate** → To study the state & behaviour of atmosphere of Earth

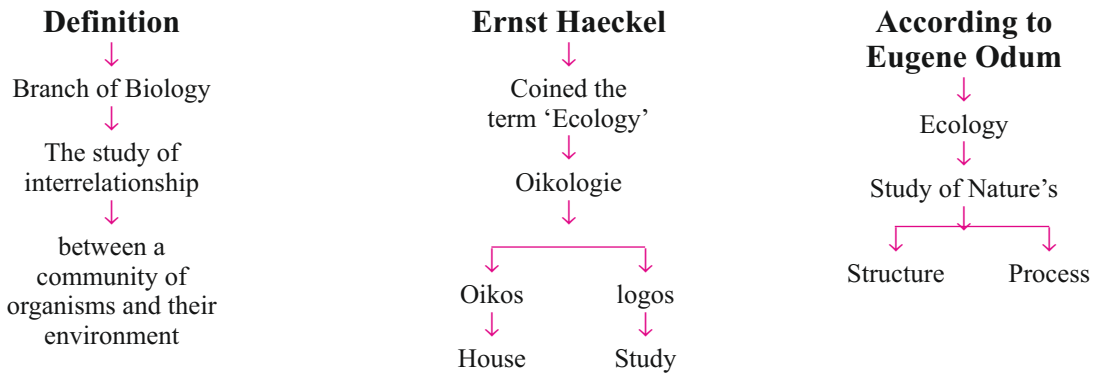
● **23 March, 1950** → International Meteorological Organization came into existence as the World Meteorological Organization

● **Headquarters** → Geneva (Switzerland)

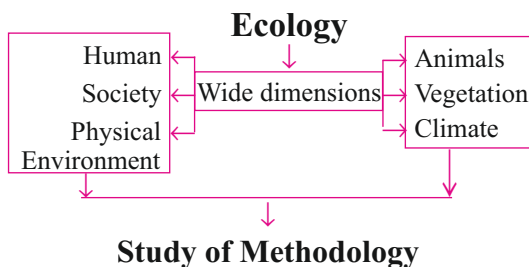
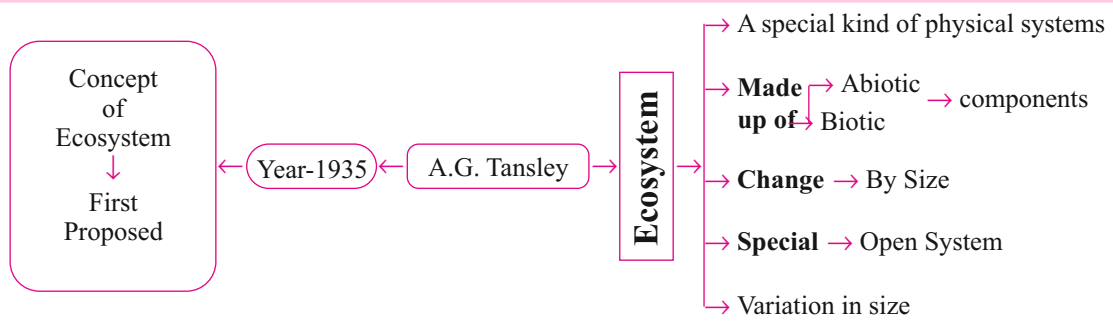
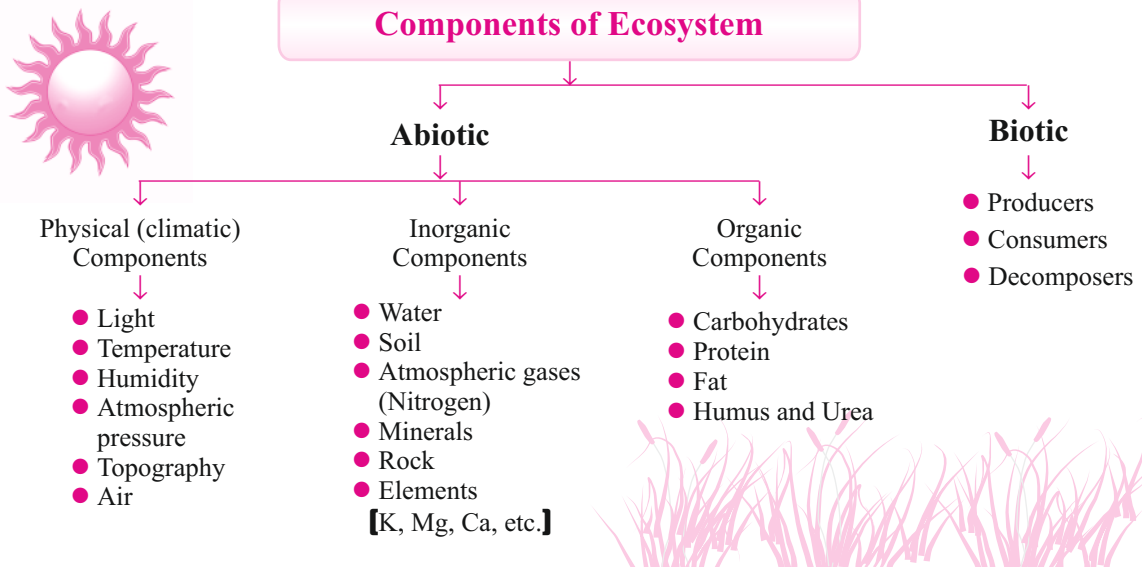
## Exam Vision

- Green Army Program was introduced for Environmental Protection **- By Australia**
- The stockholm International Summitt was held in the year 1972 **- First Global summit on Environment**
- It was decided to celebrate Environment day on 5th June **- in stockholm International summit, 1972**
- World Environment day is celebrated annually **- on 5 June**
- First world Environment day was celebrated **- in 1974**

## Ecology



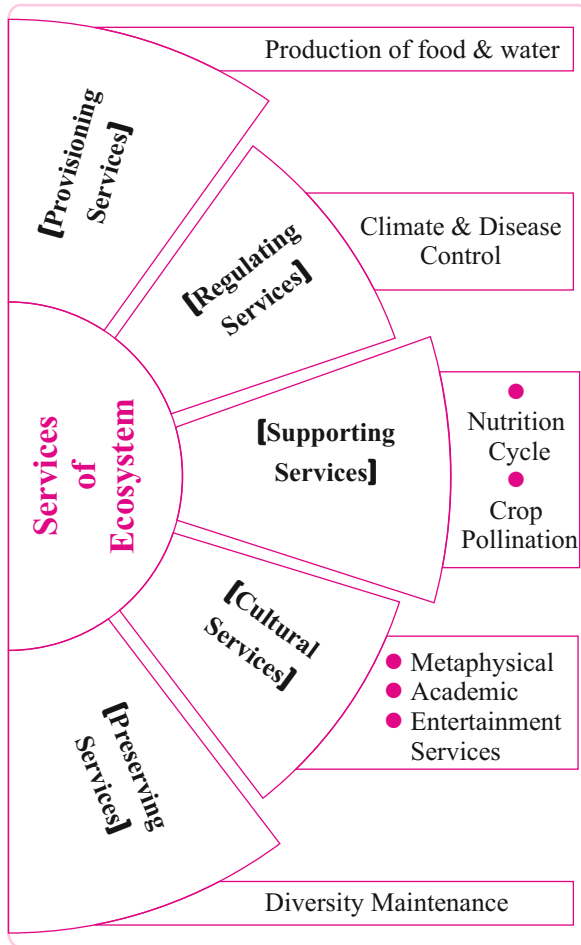
## Components of Ecosystem



## Ecosystem

- Functional unit of Nature
- **Ideology**
  - **Karl Mobius** → Biosynthesis
  - **Forbes** → Microcosm
- **Earth** → Example of Large Ecosystem





**Biosphere**

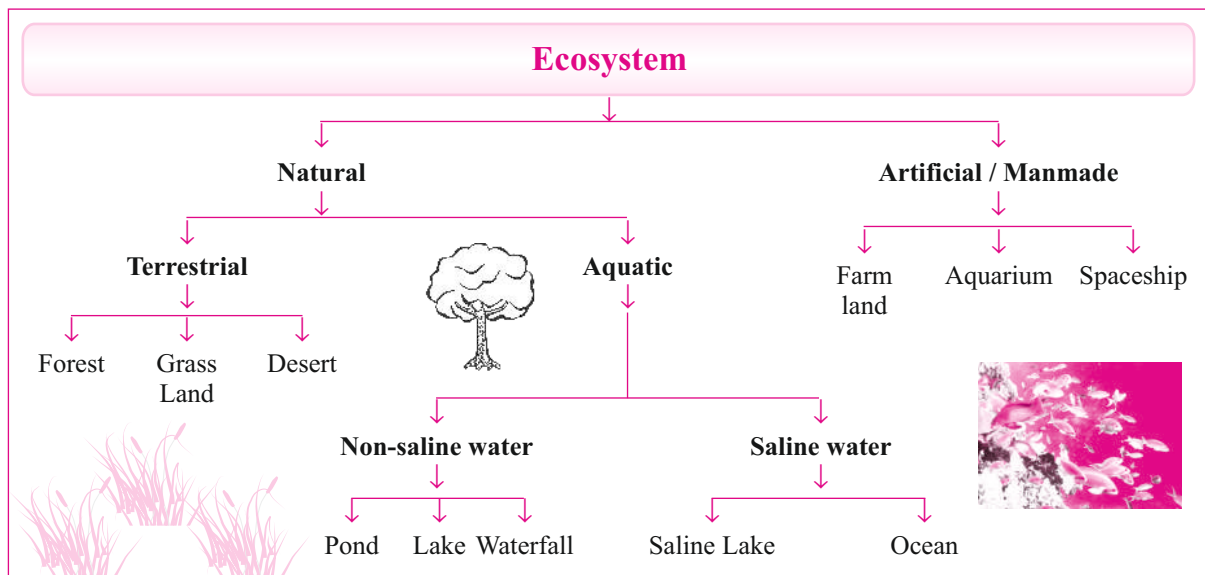
- Soil
- Water
- Air
- Shell

Made of → **Thin layer**

Found as Mantle around the earth

**Important Facts**

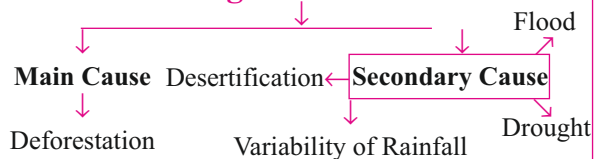
- The place where plants or organisms or other organisms of a particular species live, is called **-Habitat**
- As we move beyond each trophic level in the Ecosystem **-Loss of Energy**
- The components that make their own food by photosynthesis & chemical synthesis are called **-Autotrophs**
- Forest, ponds & lakes are **-Natural Ecosystem**
- Man-made artificial ecosystem is **-Paddy Field**
- The most common salt found in sea water is **-Sodium Chloride [NaCl]**



**Oceanic Water**

- **Ocean** → The largest ecosystem in the earth's hydrosphere
- **97%** → Of the hydrosphere on earth
- **Most commonly found salt** → Sodium Chloride

**Ecological Imbalance**



## Miscellaneous

### Important Information on sustainable development

#### Environment Related Information

- Related to biological habitats
- Related to Natural Resources
- In Reference to the basic factors of the Environment
- Current Environment status

#### Information Related to man & his Activities

- Population growth rate
- Population Size
- Various Resources & food availability
- Non-Essential Structural Facilities
- Average standard of living and per capita income
- Technical Level

### Environmental Degradation

Destruction of Natural Habitat      Loss of Biodiversity      Degradation of Natural Resources

Damage to Environment

Most Important Role

In water cycle

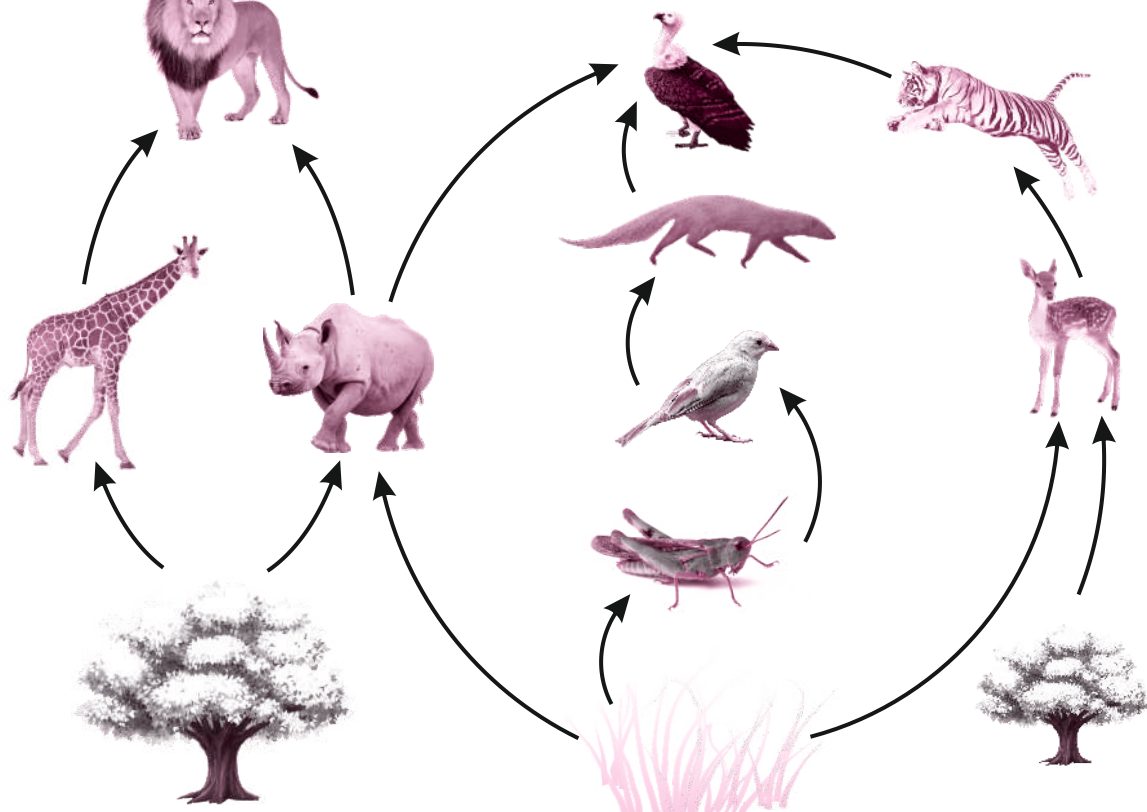
Water Evaporation

**Solar Radiation**

Conduction of Water Cycle

## Food Web

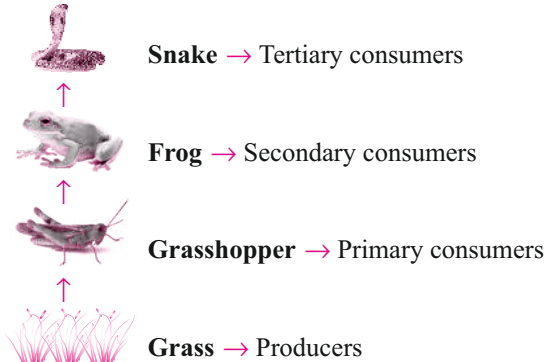
### Sequence of the food chain of tree & grassland ecosystem



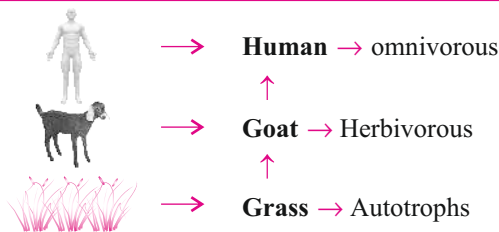
## Food Chain

### Food

- **Definition** → Substances by which living beings get energy by consuming them
- **Vegetation** → Autotrophs
- **Creatures** → Depends on other organism for food



**The correct sequence of different components in the food chain of a grassland Ecosystem**



### Food Chain

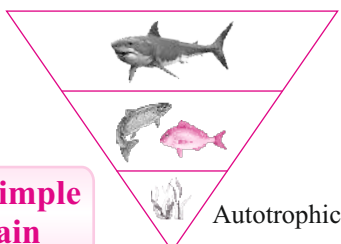
### Biotic Components

- Classification**
- **Producers** (Plants, Algae etc.)
  - **Consumers** (Animals, Human etc.)
  - **Decomposers** (Fungi/ Fungus, Bacteria etc.)

Carnivorous

Herbivorous

**Sequence of simple seafood chain**



## Important Facts

- All such plants which make food by photo synthesis are called **-Primary Producers**
- That carry out photo synthesis with the help of green pigments [chlorophyll] **-Plants**
- Phytoplanktons in the marine food chain are called **-Primary Producers**
- That is responsible for most of the oxygen present in the Earth's Atmosphere **-Phytoplanktons**
- Organism belong to the category of both decomposers and consumers **-Ant**
- Organism that obtain their food from primary producers are called **-Primary consumers**

### Butterfly

- Important role in pollination of flowering plants
- Decline in numbers adversely affects the pollination of plants
- Functions as a lower member of the food chain

## Flow of Energy

- Due to change from one form to another
  - Energy loss
- Primary Source of Energy in Ecological niche
  - Solar Energy
- Biosphere Ecosystem
  - The sum of all Ecosystem on Earth
  - Unidirectional flow of energy
- From abiotic system to biotic system
- From Producers to primary consumers
  - ↓
  - From primary consumers to secondary consumers
    - ↓
    - From secondary consumers to tertiary consumers

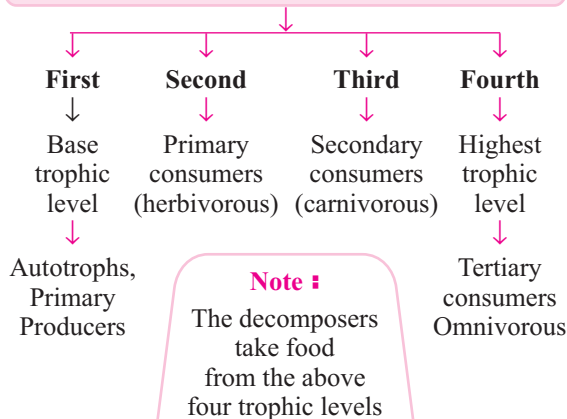
Decrease in the amount of Energy Available at Each trophic Level

### Note

- The energy taken by the autotrophs is not converted back into solar energy and the energy transferred to the herbivores cannot be recovered by the autotrophs.
- So the flow of energy is unidirectional
- In different ecosystems, only about 10% of the gross productivity of producers is adopted by vegetarians.

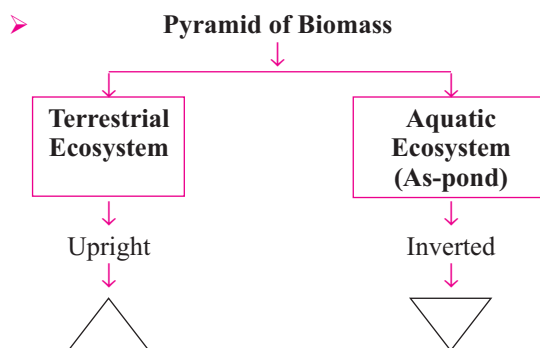
### Trophic Levels

There are three to four trophic levels in food chain of the Ecosystem



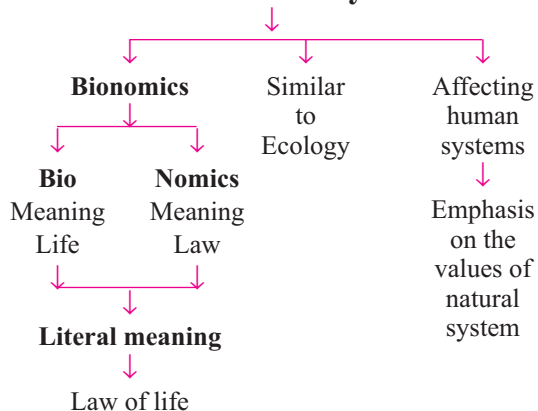
### Pyramid of Biomass

- **Definition** - Graphical Representation of the total amount of living matter present at each



### Bio Forestry & Biological Magnification

#### Bio-Forestry



Introduced by  
Raymond  
Lindeman in  
1942

10% of the net primary  
productivity of the producer  
is accumulated by the  
herbivorous animal

**10  
Percent  
Rule**

This herbivore is  
eaten by carnivore (Non-  
vegetarian) animal, 10%  
of the herbivore's  
energy is stored

**Conclusion**-Only  
10% of energy is  
transferred from one  
trophic level to another  
and 90% of the energy is lost  
during transfer respiration and  
digestion processes.



## DDT

- **Full Name**-Dichlorodiphenyl trichloroethane
- Non-Biodegradable, pesticides
- Almost impossible to get out by excretion after being absorbed
- Don't degrade biologically
- **Concentration in food chain**
  - Primary level<Secondary level<Tertiary level
- Generally deposited in the fatty tissue of organism

## Biogeochemical Cycle

### Definition

Changes in the biological phase of abiotic elements in an ecosystem and

Return of organic matter into abiotic form

Of format

### Bio-Geo-Chemical Cycle

#### Type

**Gaseous cycle**  
[For Example -  
Oxygen (O<sub>2</sub>) Cycle,  
Nitrogen (N<sub>2</sub>) Cycle]

**Sedimentary cycle**  
(For Example-  
Calcium (Ca)  
Phosphorus (P)  
Sulphur (S)  
Potassium (K) Cycle)

## Ecological Footprint & Measurement

### Ecological Footprint

- **Unit of Measurement** → Global Hectares
- **Definition** → The necessary amount of ecological components that a human being needs for his lifestyle to run smoothly
- **Measurement of** → carbon emitted by humans

## Ecosystem- Miscellaneous

### Eucalyptus

- **Environmental Enemy**
  - Name given due to excessive water holding
- Extreme fall in the water level of the soil of the planted Area
- Available in abundance in the continent of Australia

### Lentic Habitat

- Static Water habitats (Marshes, ponds, lakes, swamps)

### Lotic Habitat

- Moving water habitats (River)

### Ecotone

- Region of transition between two biological communities

## Environmental movements

### Chipko

- Important movement to stop cutting of trees
- Special : Women stood clinging to The trees

### Narmada Bachao

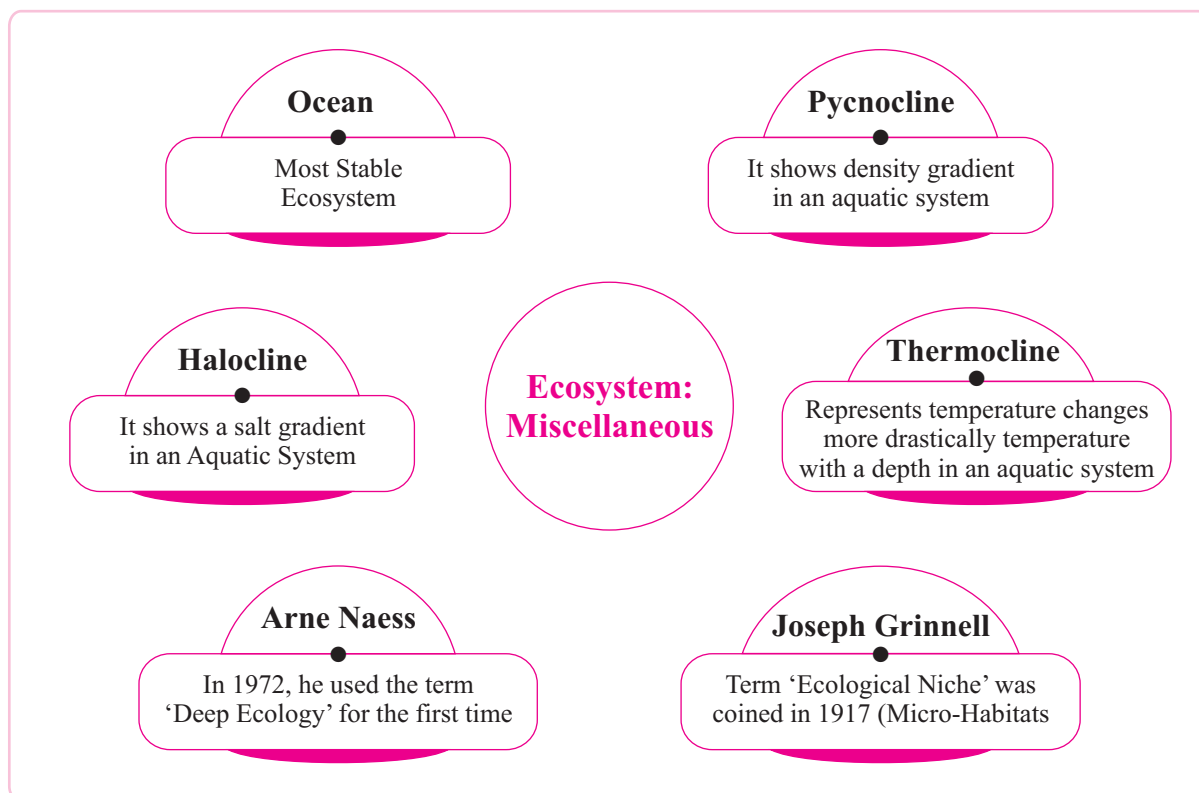
Movement launched to stop the multipurpose Dam projects which were being constructed over the Narmada River

### Appiko

- The movement is related to South India's environment protection
- Started in Karnataka

### Save the Silentvalley

- Started in Kerala
- **Objectives** -  
Cancellation of the dam plan to be built on Kuntipuzha



Ecosystem : Miscellaneous	
Year	Act
1972	Indian Wildlife Protection Act
1980	Forest Conservation Act
1986	Environment (Protection) Act
2006	Scheduled tribes and other traditional forest dwellers (Recognition of Forest Rights Act)

Biodiversity	
Definition	
➤ 1	Categories of different species in an environment → Biodiversity
➤ 2	The diversity of living organisms (Plants & animals) present in an Ecosystem

Biodiversity		
Types of Biodiversity		
Division → In 1972 by Whittaker		
<b>Alfa [<math>\alpha</math>]</b> <b>Index</b> Species diversity within a community/habitation at the local level	<b>Beta [<math>\beta</math>]</b> <b>Index</b> Structural diversity of species present locally	<b>Gamma [<math>\gamma</math>]</b> <b>Index</b> The complete Diversity of a landscape

First use of the term 'Biodiversity'	
➤	<b>Raymond F. Dasmann-</b> Initially the English term "Biological Diversity" was first introduced in 1968 in his book 'A different kind of country'
➤	<b>Walter G. Rosen-</b> Later, he used firstly the term 'Biodiversity' changing from 'Biological Biodiversity'.

## Biodiversity Day

- **29 December** → Declared by several countries of the world
- **22 May** → Declared by United Nations Organization
- **Special Facts** → 29 December, 1993 → Biodiversity convention (Came into force)

### N.C.M.B.

- **Full Name** → National Centre for Marine Bio-diversity (India's First National Centre)
- **Located** → Jamnagar (Gujarat)
- **Speciality** → India's First Research Institute to be formed in partnership with public, private partnership (PPP)
- **Objective** → Protecting the bio-diversity located in the costal Zone

## Gradient of Biodiversity

- Uneven distribution on Earth
- Increases towards the equator
- Maximum biodiversity

↓  
In Tropical Rain Forest

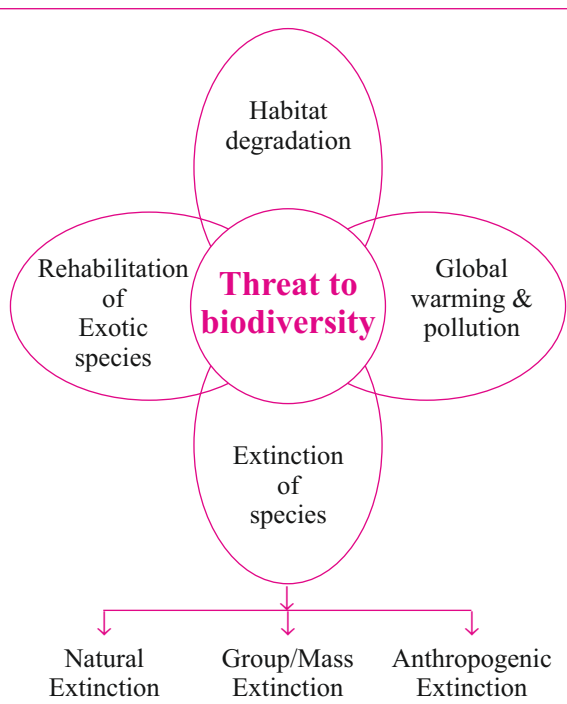
## Important Facts

- Biodiversity is found in the lowest latitude as compared to the higher latitudes  
-Generally More
- Biodiversity is found in mountainous regions at lower altitudes than at higher altitudes  
-Generally More
- India aims to achieve land degradation neutrality  
-By 2030
- The Marine National Park of India is located in  
-Gulf of Kutch
- Silent Valley (Kerala) was declared as a National Park in  
-1984
- Valley of Flowers is located  
-Chamoli (Uttarakhand)

## Biodiversity Hotspots

### Biodiversity Hotspot

- **Definition** → Places where sufficiency of species and abundance of local species are found, but at the same time there is a constant threat to the existence of these species
- **First use of the this word** → By Norman Myers in 1988
- **The places/sites** → Tropical Region, High Altitude Regions



## Major Factor of Habitat Loss

### Exam Vision

- It is helpful in the development of biodiversity  
-Reforestation of Barren land
- The warm climate zone is considered the best place to live for  
-Butterfly (Indecisive)
- Most species of Butterfly are found  
-In tropical region
- Biosphere Reserve Preservation Areas belong to  
-Genetic Variations



## Conservation of Biodiversity

### Biosphere Reserve

- **Important Strategy**
  - For the conservation of Bio-diversity
- **Purpose of Establishment**
  - Conservation of biodiversity mainly in-situ of natural and semi-natural lands

## Biodiversity Conservation

### Techniques

- ➔ **In-Situ** → Conservation of Flora or Fauna in their original natural habitat
- ➔ **Ex-Situ** → Protection of Endangered species of Flora & Fauna Isolated from their natural habitat

## Ex-Situ Conservation

### 2 Methods

#### First Method

Nurture of Endangered species in Zoological parks

#### Second Method

Preservation of living sperm, egg and embryo samples in liquefied nitrogen at extremely low temperatures

## Bio-diversity Conservation

### In-situ

Protected Area Network

- Sacred Lakes & forests
- Biosphere Reserve
  - Terrestrial
  - Oceanic/Marine
- National Parks
- Wild Life Sanctuaries

### Ex-situ

- Sacred Plants
- Gardens
- Zoological Gardens
- Botanical Gardens
- Tree Gardens
- Water System
- Zoo
- Seed Banks
- Gene Banks
- Cryopreservation

To provide facilities for public awareness training and education

Maintaining the diversity and integrity of plants animals & micro-organisms

### Biosphere Reserve : Main objectives

To promote research in ecology

To promote sustainable economic development from socio-cultural, & ecological point of view

Gulf of Kutch

Gulf of Mannar

### Four Major Coral Reef Areas in India

Lakshadweep

Andaman & Nicobar Islands

## Coral Reef Area

### Types

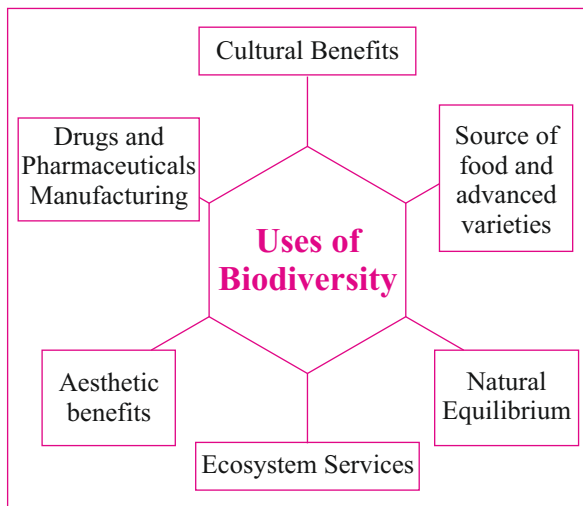
#### Fringing

Gulf of Mannar, Gulf of Kutch, Andaman & Nicobar Island

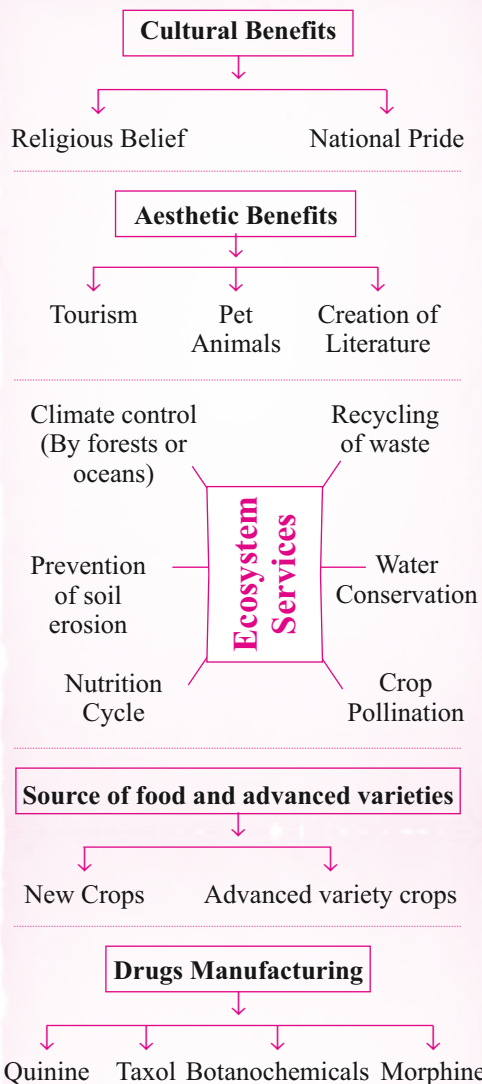
#### Atoll

Lakshadweep





## Uses of Biodiversity



## IUCN

- **Full Name** → International Union for Conservation of Nature
- International Organization
- Works for nature's conservation & sustainable use of natural Resources
- A separate organization from the United Nations
- **Official Status** → Observer at the United Nations General Assembly
- **Publication** → 'Red Data Book'
  - Includes lists of Endangered Plants and Animal species on the verge of Extinction
- A species is extinct when there is no reasonable doubt that the last Individual has died
  - A species is considered extinct when it has not been seen in its natural habitat for 50 years

### Benefits of List

- To create awareness about the importance of Biodiversity (threatened)
- Identification and record keeping of threatened species
- Preparation of written list of biodiversity
- Direction of conservation measures at the local level

## Biodiversity & Endangered Species

### Diclofenac Sodium

- **Pain killing Medicine** → For Animals
- **Treatment in Fever** → For Animals
- Animals death during its use
  - ↓
  - Meat eating by Vultures
  - ↓
  - Vulture dies within 30 days
- **Adverse effects** → 8.50 crore vultures died in India, Nepal & Pakistan

### Tambalacoque

- Tree found in Mauritius
- **Other Name** → Dodo plant
- On the verge of Extinction
  - ↓ Reason
  - Extinction of the Dodo birds
  - ↓ Resultant
  - Dodo plants failed to breed
- **Seed**
  - The staple food of the Dodo birds

## Indian Flying Fox

### → Species of Bats

### → Found In

- Bangladesh
- China
- India
- Maldives
- Nepal
- Pakistan
- Sri Lanka

→ Other Name → Great Indian Fruit Bat

## Dugong

- Large Marine Mammal
- **Existence** → Vulnerable
- Herbivorous mammal
- **Other Name** → Sea cow (because of eating of sea grasses)
- **Where it is found [Regions]** → Eastern Africa, South & South East Asia, Australia
- **India's Perspective** ● A large number of Dugong are inhabiting in Gulf of Mannar & Palk Strait (between India & Sri Lanka)
- **Other Indian Regions** ● Gulf of Kutch  
● Saurashtra coast  
● Andaman & Nicobar Islands
- **Legal Protection** → Under schedule I of the Wildlife (Protection) Act, 1972

## Indian Wild Ass

- **Natural Habitat** → Rann of Kutch
- Existence is threatened due to the destruction of habitat

## Lion Tailed Macaque (Monkey)

- **Residence Area** → Southern Westernghat
- **Residence State** → Tamilnadu, Kerala, Karnataka etc.

## Flying Squirrel

→ Found in many parts of India; Russia, China Japan, Europe, Africa, North America

### → India

- Total 12 species are found
- Maximum in Himalayan region (6 species)

## Origin

Mexico, South America and Caribbean Region

## Group

small plant or shrub

## Arrival in

### India

in 19th century

## Prosopis Juliflora

## Tamil Name

Seemai Karuvelam

## Hindi Name

Bilayati Babool (Acacia)

## Effect

Harmful to Environment

## Prosopis Juliflora

Roots deeper to a great Extent, Absorption of Water

Harmful to Biodiversity

Absorption of ground water on a large scale

## Adverse Effects

Emission of various toxic substances into the atmosphere

Loss of air humidity in the surrounding area

Another plant near it does not grow properly

## Red Panda

- **Scientific Name** → Ailurus Fulgens
- **Other Name** → Fire cat
- **Special Fact** → Like Raccoon
- **Habitat Area**
  - **India** → Naturally Found in sub-Himalayan region of North East India (Mainly in Sikkim, West Bengal and Arunachal Pradesh)
  - **World** → Nepal, Bhutan, China, Laos, Myanmar

**Jammu & Kashmir [3]**

- Wular Lake
- Surinsar Mansar Lakes
- Hokera Wetland

**Rajasthan [2]**

- Keoladeo National Park
- Sambhar Lake

**Maharashtra [2]**

- Nandur Madhameswar
- Lonar Lake (Crater Lake)

**Andhra Pradesh [1]**

- Kolleru Lake

**1-List of Ramsar Sites in India (Total-47)**

\*Map not to scale

**Uttar Pradesh [9]**

- Upper Ganga River
- Nawabganj Bird Sanctuary
- Parvati Arga Bird Sanctuary
- Samaspur Bird Sanctuary
- Sarsai Nawar Jheel
- Sandi Bird Sanctuary
- Saman Bird Sanctuary
- Sur Sarovar
- Haiderpur Wetland

**Manipur [1]**

- Loktak Lake

**West Bengal [2]**

- East Calcutta Wetlands
- Sunderbans Wetlands

**Note :** There are total 47 Ramsar sites in India

**Note :** Indicated points indicate the respective states and not the actual sites.

**Haryana [2]**

- Sultanpur National Park
- Bhindawas Wildlife Sanctuary

**Ladakh [2]**

- Tso-Moriri
- Tso-Kar Wetland Complex

**2-List of Ramsar sites in India (Total 47)**

\*Map not to scale

**Himachal Pradesh [3]**

- Chandertal Wetland
- Pong Dam Lake
- Renuka Wetland

**Punjab [6]**

- Keshopur-Miani community reserve
- Nangal wildlife sacntuary
- Beas conservation reserve
- Harike Lake
- Kanjli Lake
- Ropar Lake

**Uttarakhand [1]**

- Asan Conservation Reserve

**Assam [1]**

- Deepor Beel

**Bihar [1]**

- Kabartal Wetland

**Gujarat [3]**

- Nalsarovar
- Vadhvana Wetland
- Thol Lake Wildlife Sanctuary

**Madhya Pradesh [1]**

- Bhoj Wetlands

**Tripura [1]**

- Rudrasagar Lake

**Odisha [2]**

- Bhitarkanika
- Chilka Lake

**Kerala [3]**

- Asthamudi Wetland
- Sasthamkotta Lake
- Vembanad-Kol Wetland

**Tamilnadu [1]**

- Point Calimere Wildlife and Bird Sanctuary

## Ramsar Convention

### Wetland Area

- Biodiversity archive
- The Area between an Aquatic & terrestrial Ecosystem
- Sponges for absorbing and filtering water in nature

### Important Facts

- Gland (Switzerland), headquarters of Ramsar secretariat
- **2 February** - World Wetlands Day
- **Gujarat** - The state with the largest area under wetlands in India
- **Montreux Record** → This list of wetlands of International importance is a register of those wetlands where the ecological characters of the wetlands has changed as a result of human intervention.
  - Either occurred
  - Or Occurring

## Ramsar Convention

- Related to the protection of wetlands
- **Ramsar**
  - Situated in Iran
  - Meeting on 2 February 1971
  - The foundation of the convention was laid
- **21 December, 1975** → complete Implementation of the conference

## Various Acts & Agreements

### Biodiversity Act

- **Passed Date** → 11 December, 2002  
[By Indian Parliament]
- For the implementation of the provisions
  - National Biodiversity Authority
- **Formation**
  - Year 2003
  - **Headquarters** → Chennai (Tamilnadu)

### Birdlife International

- A Global partnership of conservation organizations
- Working for the conservation of birds, their habitats & global biodiversity
- The world's largest partnership for the conservation of nature
- 121 Partners in the World

## Bio-Safety

### Cartagena Protocol

#### First meeting of the parties [COP-MOP1]

**Date**  
23-27 February, 2004

**Place**  
Kuala Lumpur (Malaysia)

#### India

The agreement was signed/ratified on 23rd January, 2003/ 17th January, 2003

#### Affiliation

from genetically modified organisms

#### Special

United states of America  
Non member

## TRAFFIC

### Full Name

Trade related analysis of Fauna & Flora in commerce

### Special

Non-Governmental organization

### Mission

It supervises trade of plants and Animals in the context of sustainable development & biodiversity conservation

### Establishment

Year 1976

### Strategic Alliance

Of IUCN & WWF

## Important Facts

- Biodiversity hotspot was conceptualized  
-By **British Environmentalist Norman Myers**
- Works to prevent biopiracy and preserve Indigenous and traditional genetic resources  
-**National Bio-Diversity Authority**
- The World Heritage Convention and the United Nations Convention to combat desertification are related to  
-**Biodiversity**

## Biodiversity Policy & Center of Laws

- Joint effort of Government of India & Government of Norway
- **Location** → Chennai (Tamilnadu)
- **Objective** → To develop professional competencies and capacity building in biodiversity policies

## TEEB

- **Full Name** → The Economics of Ecosystems and Biodiversity
- **Office** → Geneva (Switzerland)
- Global Initiative
- **Focus** → Draw attention to biodiversity & the economic benefits of the ecosystem
- **Aid** → To take into account the benefits derived by the Ecosystem & biodiversity while making decisions in the decision making process
- **Role** → Leading Role for decision makers at all levels by presenting the economic benefits of ecosystems and biodiversity
- **Institution** → Working under the United Nations Environment Programme

## UN-REDD

- **Started** → September, 2008
- **Full Name** → UN-Reducing Emissions from Deforestation and Forest Degradation
- **Inter-Institutional** → Under the aegis of UNFCCC member countries
- **Associated Institutions**
  - United Nations Development Programme
  - Food & Agriculture Organization
  - United Nations of Environment Programme
- **Objectives**
  - Estimating the economic value of the amount of carbon stored in forests
  - To encourage developing countries to cut carbon emissions from forested lands
  - Conservation and sustainable management of forest by moving beyond deforestation
  - Mitigation of the effects of climate change

## Biodiversity : Miscellaneous

- India signed the Cartagena Protocol on Bio-safety  
-**23 January 2001**
- The dormant & hibernating state of organisms living in temperate and cold-dominated countries (in which many of the animals there spend the winter) is called  
-**Hybernation**
- In terms of production of Biomass, they are in the first place  
-**Tropical Rain forest**
- Biomass production occurs on an annual scale in the deep ocean  
-**Negligible**
- The name of the book of Vandana Shiva who is an active environmental activist & anti globalisation, is  
-**Tomorrow's Biodiversity**
- Biodiversity Day is celebrated by the United Nations on  
-**22 May**
- It is located in the Keonjhar district of Orissa, the Gupta ganga hill is the origin of  
-**The River Vaitarni**
- Animals Resort to Hybernation when warm-season food is not available in winter  
-**Squirrel, Bear & some Insectivorous bats**



## Wetlands International

- Non-governmental & Non-Profitable Global organization
- Working to maintain and restore wetlands & their resources
- **Headquarters** → Netherlands

## Seabuckthorn

- Tree found on the hills (Above the tree line) of Ladakh
- Its plum is rich in Vitamins & Nutrients
- To increase the energy level of his arms, it was used by Changez Khan
- **Russian Cosmonaut** → Used to protect against cosmic radiation
- **Deciduous Shrub** → Popular in India as Leh Berry
  - Ladakh Region
  - Kusumsari, Lahaul
- **Distribution area in India** → Himachal Pradesh
  - Nathula (Sikkim)
  - Uttarakhand
  - Arunachal Pradesh
- **Leaves, Fruits, roots and thorns** → All Useful
- **Conventional usage**
  - Drugs
  - Manufacturing
  - Nutritional Supplementation
  - Fuel
  - Environment Conservation
  - Barrier
- **Helpful** → In Nitrogen Stabilization
- **Ideal Plant** → To control of cold desert
- **Ability to grow** → In high altitude mountain areas

## Greenhouse Effect & Climate Change

### Greenhouse Gas

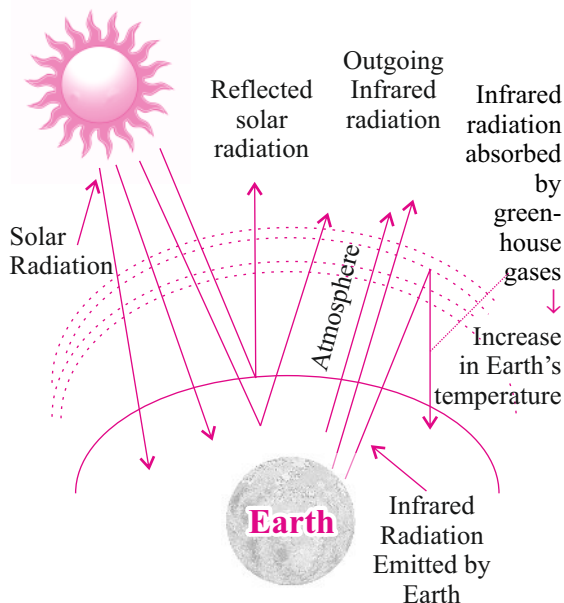
- **Directly Involved Gases**
  - Carbon Dioxide, Methane, Nitrous Oxide, CFC,  $\text{SF}_6$ ,  $\text{NF}_3$
- **Indirectly Involved Gases**
  - Nitrogen Oxide, Carbon Mono Oxide, Non-Methane Volatile Organic Compounds & Sulphur Dioxide

## Solar Energy

- Energy reaching the earth is in the form of Electromagnetic Radiations

### Components

- (UV) Radiation (Most absorbed in the Ozonosphere)
- Infrared Radiation (Arrival on Earth as thermal radiation)



## Greenhouse Effect

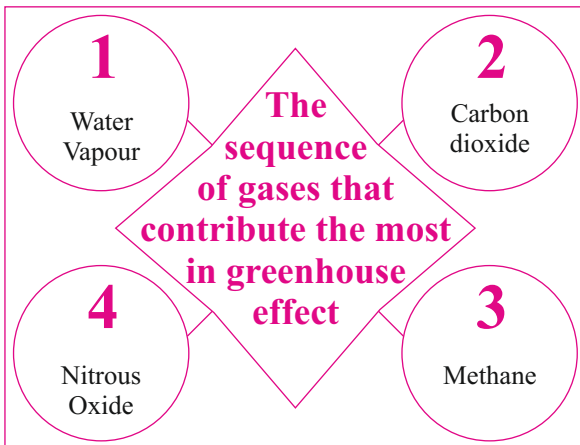
- **Other Name**
  - Global Warming
- **Definition**
  - Increase in the amount of insulating gases in the atmosphere

An increase in the average temperature of the atmosphere

- **Concept**
  - A Natural Process

### Greenhouse Gases

- **Concept** → Joseph Fourier [1824]
- **Major Gases** → Carbon dioxide (main cause of global warming)
  - Methane
  - Nitrous oxide



### Major greenhouse gases

#### Carbon Dioxide Gas

- **Classification** - both harmful and beneficial to life on earth
  - Photosynthesis
- **Photosynthesis** → Plant → Absorption of  $\text{CO}_2$ 
  - Releasing of  $\text{O}_2$
- Main cause of global warming
- Major part produced by human activities is absorbed by marine plants or land plants and soil
- Phytoplankton absorb it in the process of photosynthesis
- Took  $\text{CO}_2$  → Changes in plants material
- **Beneficial Effect** → Potentially beneficial for plants growth
- **Concentration** → More than other greenhouse gases in the atmosphere

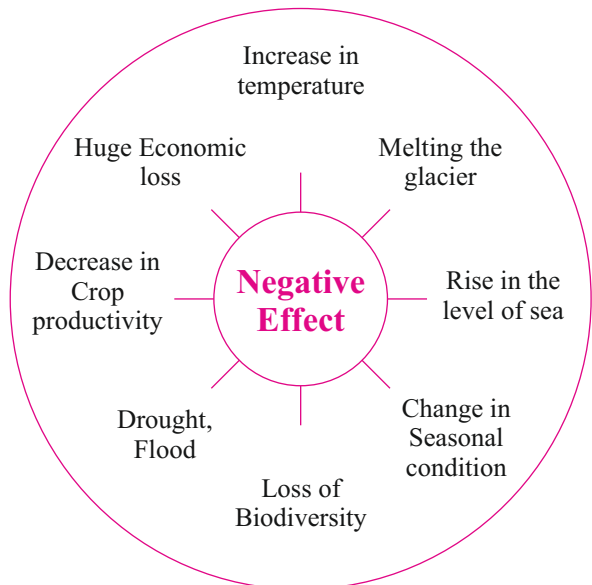
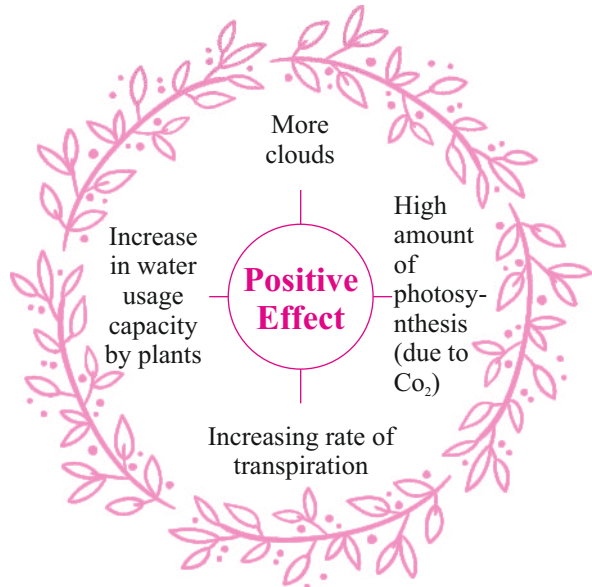
#### Methane

- **Chemical Name** →  $\text{CH}_4$
- **Other Name** → Marsh Gas
  - Biogas
  - Bacterial Decomposition
  - Ruminant Animals
- **Source**
  - Paddy fields
  - Coal Mines
  - Wetlands
  - Ocean
  - Hydrates
- **Natural Sources**
- **Air pollution**

### Effect of Global Warming

**Positive Effect**

**Negative Effect**



### Exam Vision

- According to the Intergovernmental Panel on Climate Change (IPCC), there will be increasing temperature between the year 1990-2100 **- 1.4 - 5.8°C**
- According to the IPCC, sea level will be raised

## Climate Change

### Climate Change Conference

UNFCCC

- **Full Name** → United Nations Framework Conventions on Climate Change
- **International Treaty** → In 1992 at "Rio Earth Summit"
- **Constituted** • In Rio-de-Janeiro
  - Environment & Development conference (at United Nations)
- **Alternative Name** → United Nations Conventions on Climate Change
- **Enforcement date** → 21 March, 1994 (supported by over 50 countries)
- **Present Scenario** → Ratification by about 197 countries of the world

### UNFCCC Meeting Year 2015, Paris Agreement

- **Determined Targets-**
  - Limiting green house gas emissions
  - Average global temperature rise by 2°C pre-Industrial levels by the end of 21st century or
  - If possible, don't exceed 1.5°C
  - 100 billion Dollars Climate fund to be deposited by the year 2020 (by developed countries)
- **Enforcement date** → 4th November, 2016
- Currently signed by 195 countries

### Earth Hour

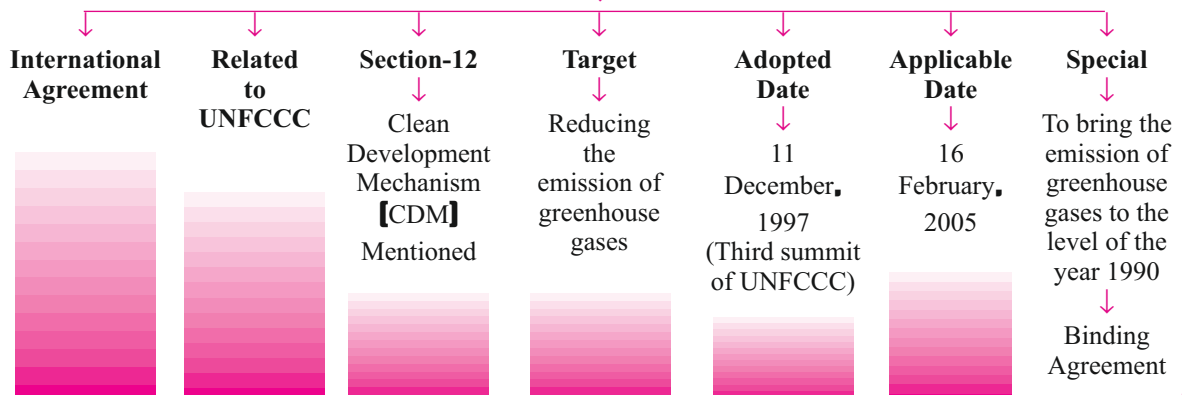
- Worldwide movement of the World Wildlife Fund for nature
- On the last Saturday of March, the use of Electrical appliances stopped for 1 hour [8.30 pm - 9.30 pm]
- **Objective** → Bringing awareness about the climate change and the need to save the earth

### Green Climate Fund (GCF)

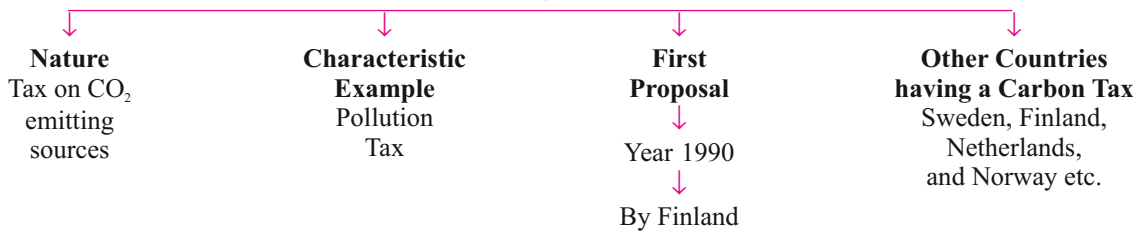
- A fund within the framework of the UNFCCC
- **Purpose of** → To assist developing countries in **Establishment** adaptation & mitigation processes to combat climate change
- **Administration** → [GCF] By Green Climate Fund Board
- **Established at** → United Nations Climate Change Conference (Cancun, Mexico) in 2010

## Kyoto Protocol and other protocol treaties

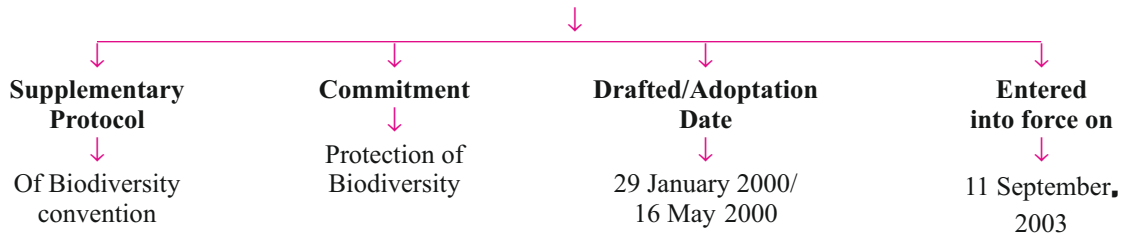
### Kyoto Protocol



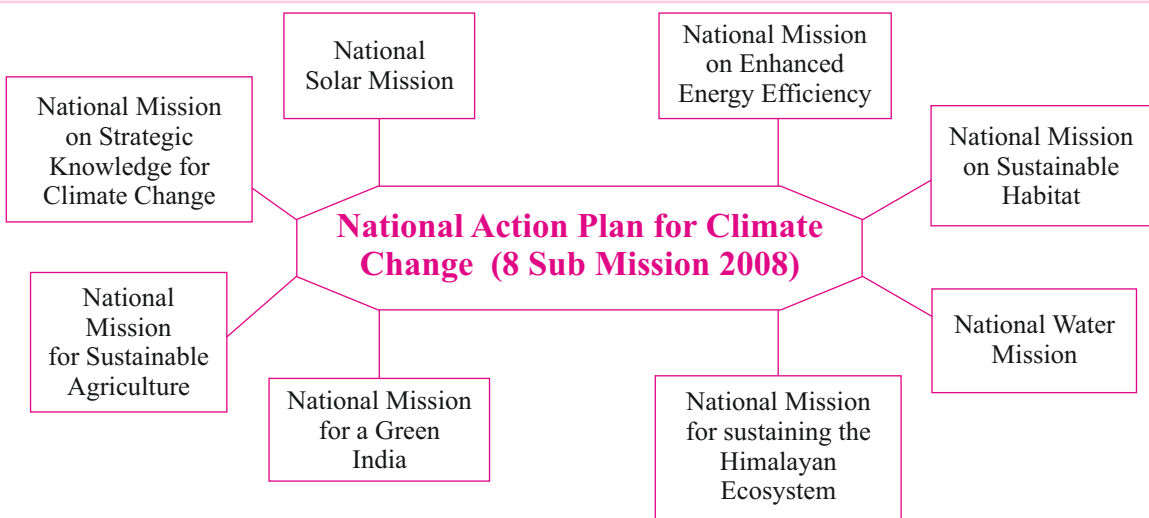
## Carbon Tax (Tax)



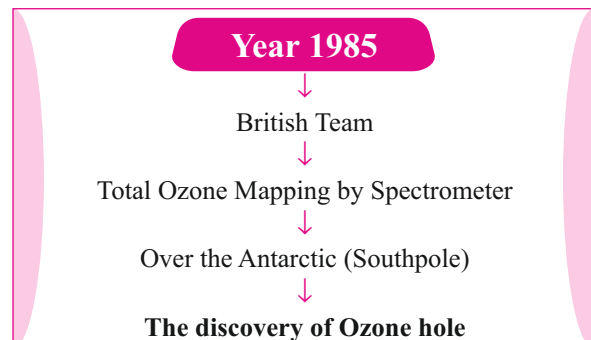
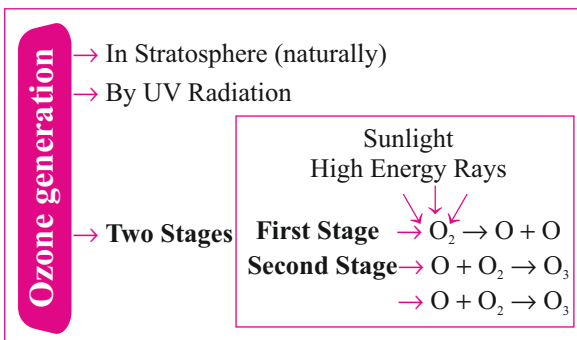
## Cartagena Protocol

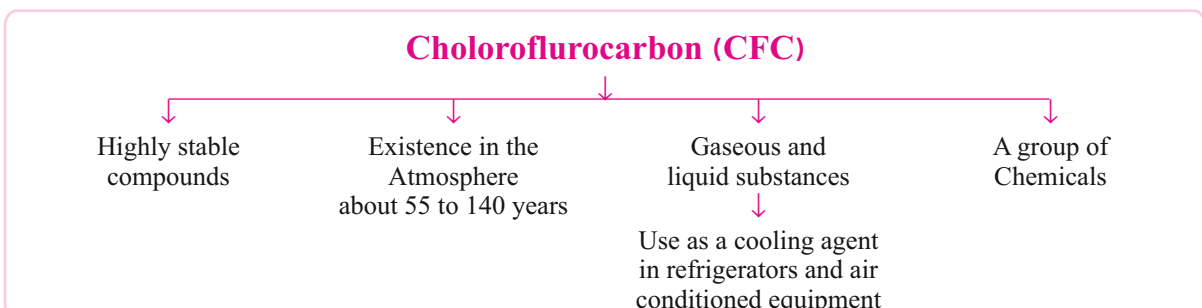
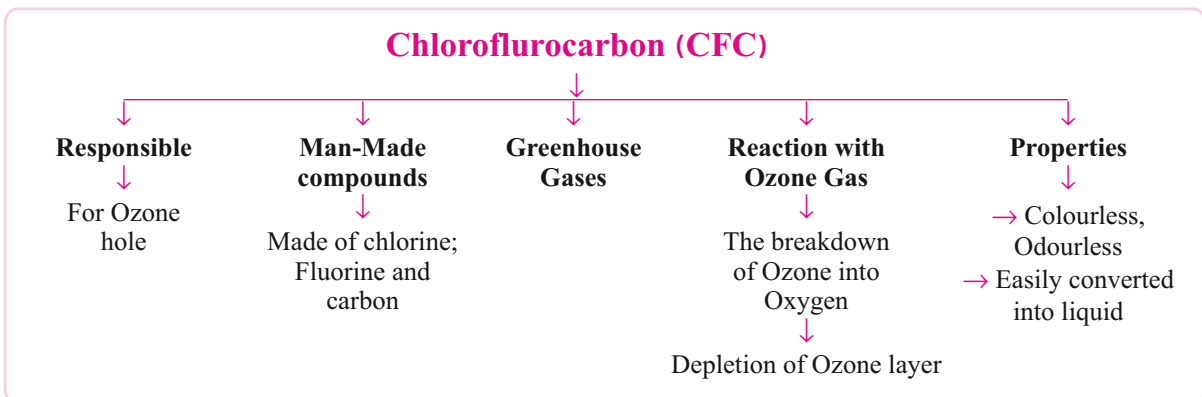
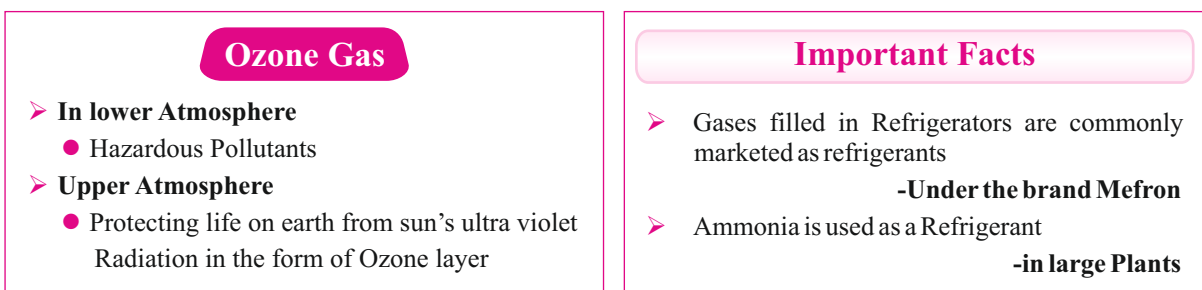
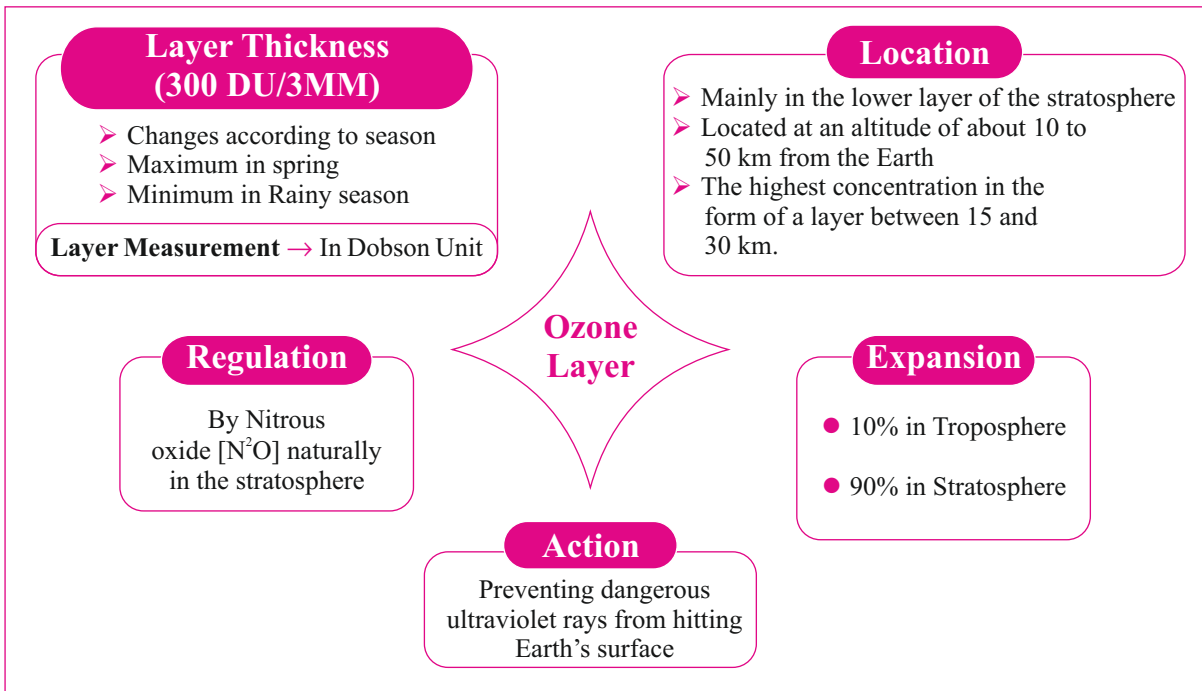


## Climate change : India's Action plan



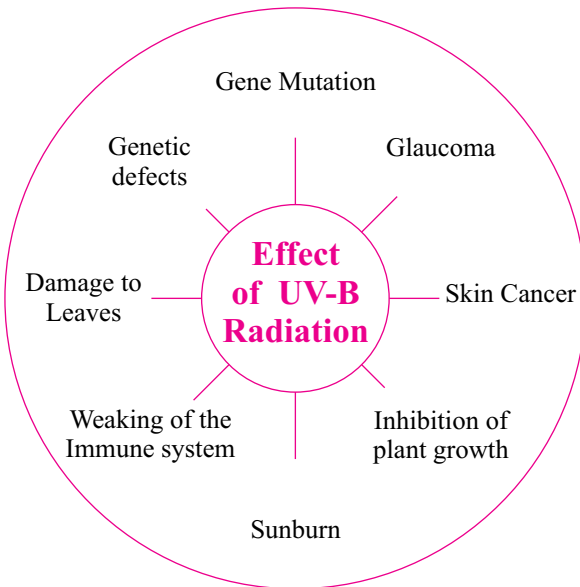
## Ozone Layer Depletion



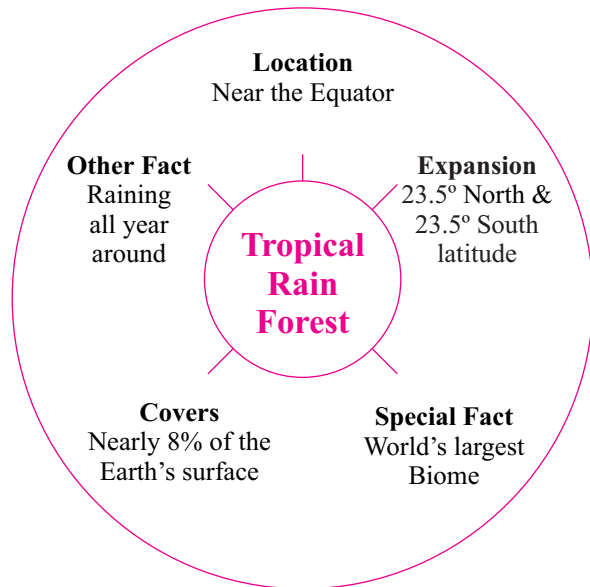




## Preservation of the Ozone Layer



## Forest & Wildanimal



### Important Facts

- Responsible gases for the Ozone depletion are  
- **CFC, Halogens, Nitrous Oxide, Trichloroethylene, Halon-1211, 1301, etc.**
- The effect of Ozone depletion is most visible  
- **Over the poles**
- Most of the Ozone hole has been formed  
- **Over Antarctica**
- The Ozone hole was recorded in the year 2005 over the Tibetan plateau  
- **By G.W. Kent Moore**
- The Montreal Protocol, a protocol of the Vienna Convention is related to  
- **Ozone layer conservation**
- Montreal Protocol came into force on  
- **1 January 1989**
- International Ozone day is observed annually on 16 September  
- **For Conservation of Ozone layer.**

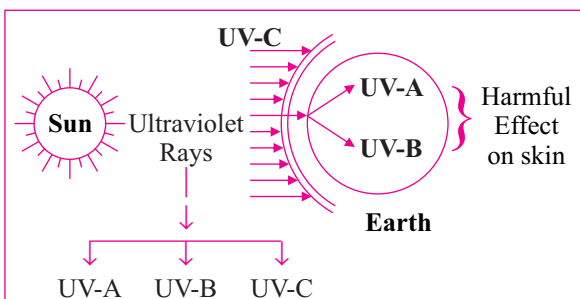
### Equatorial Forest

- In tropical regions with more than 200 cm of rainfall
- **Major Vegetation** → Long & broad leaves, Evergreen plants
- Covers about 80% of the world's biodiversity

### Amazon Rain forest

- **Other Name**  
→ Amazonia or Amazon forest
- Moist forest with broad leaves
- **Location**  
→ South America (Amazon basin)
- **Another Name** → Lungs of Earth
  - Produces more than 20% of the Earth's Oxygen

### Effect of Ozone layer (depletion)



### Exam Vision

- Taxus tree found in the Himalayas naturally is listed in  
- **Red data Book**
- A drug called taxol, which is effective in cancer, is found  
- **From Taxus Tree**
- The forests that grow in the saline waters of the coastal in the tropical and sub-tropical regions are called  
- **Mangrove Forest**
- Sundari trees are found in  
- **Sunderban Delta**
- The Island of Goa which is fully protected Kutch vegetation Area  
- **Chorao Island**

## Benefits & Uses of Forests

### Natural Resources

↓ **[Classification-On the basis of development's stage]**

Potential Resources

Real Resources

Reserve Resource

Stock Resources

#### Cultural Benefits

- Metaphysical
- Educational
- Cultural
- Literary Creation

#### Productive Activities

- Fruits
- Resins
- Alkaloids
- Rubber
- Drugs

#### Regulatory Activities

- Temperature control
- Absorption
- Control of Flood & Drought
- Balance of gases **[CO<sub>2</sub>, O<sub>2</sub>]**
- Regulation of the biogeochemical cycle of carbon

#### Protective Activities

- Land conservation
- Water conservation
- Drought, Cold, Air
- Protection from Sunlight
- Prevention of Noise Pollution

**Services  
Provided  
by forests**



## Deforestation : Causes & Effects

Ignoring sustainable development in policy making

Forests Fire

Expansion of cultivable land

Excessive cattle's grazing

Development of Roads

Indiscriminate commercial use of wooden plants

**Reason of Deforestation**

Urbanization

Industrialization



Adverse-effects on Regional & global climate

Minimum Rain

Drying of water resources in the Himalayas

Biodiversity loss

Species Extinction

Flood & Droughts

Increase in global warming

Desertification

Degradation of soil fertility

Soil Erosion

**Effect of Deforestation**



## Classification of forests

Protected Forest

National Forest

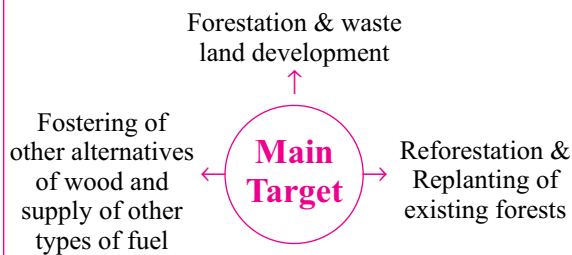
Village Forest

Tree Land

### Important Facts

- Resources that can be used repeatedly by and does not run out **-Renewable Resources**
- If a bridge is made from a tree without cutting it, then that bridge is called **-living bridge or natural bridge**
- Due to its eco-friendly nature and renewable, it has been called green metal **-Aluminium**

### National Forest Policy, 1988



### Main Objectives : National Forest Policy, 1952

- Promotion of social forestry
- One third (33%) of forest cover of the total land of the country

### Indian Efforts related to conservation of forest resources

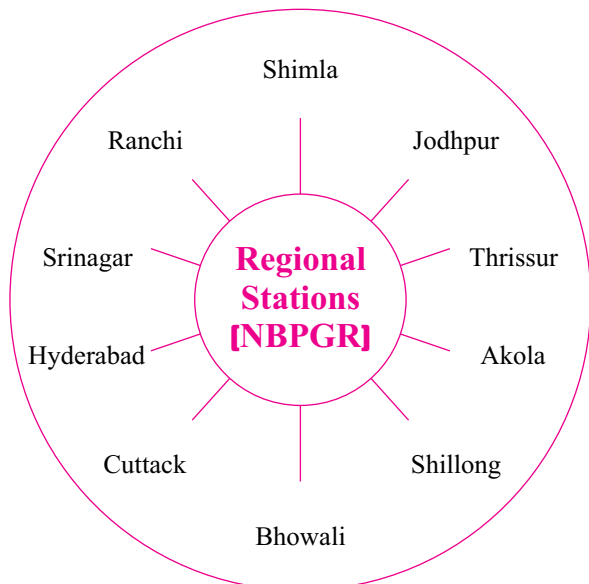
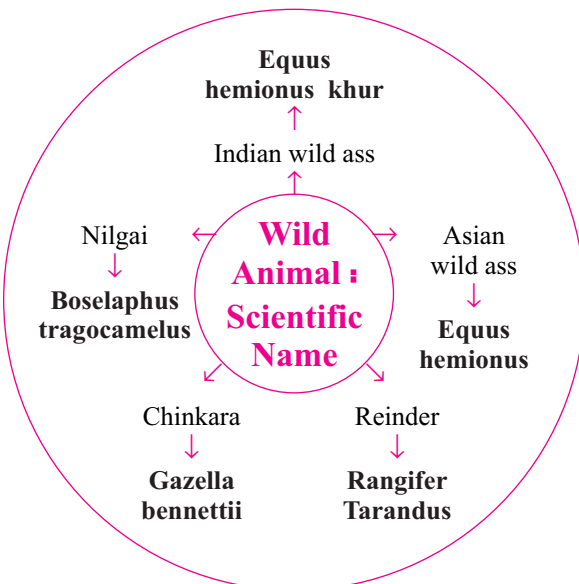
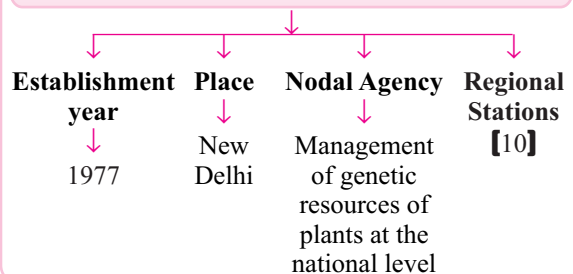
#### Wildlife (Protection) Act

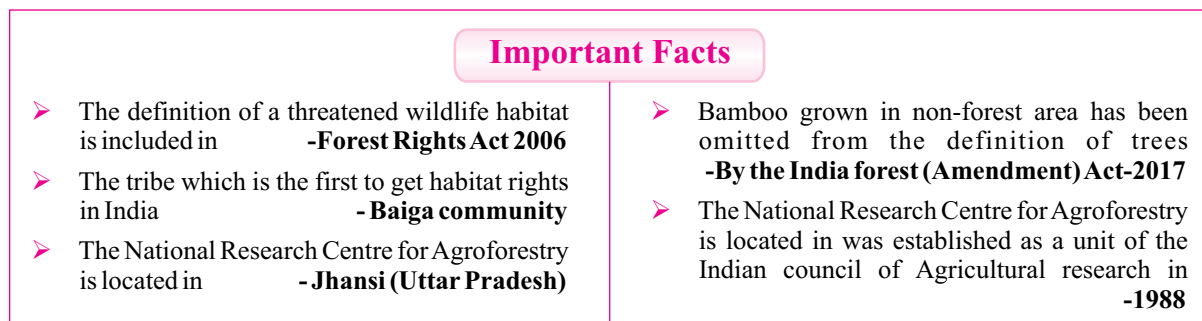
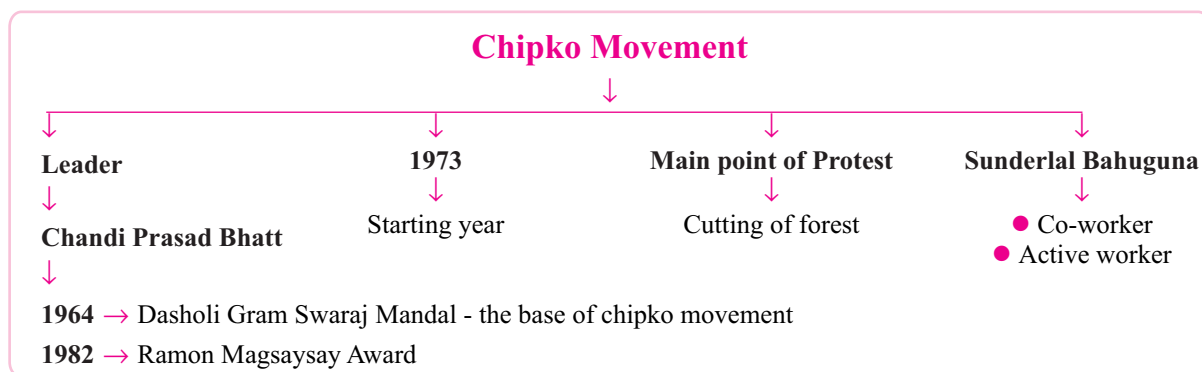
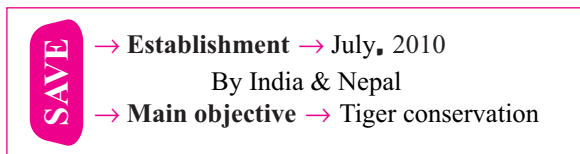
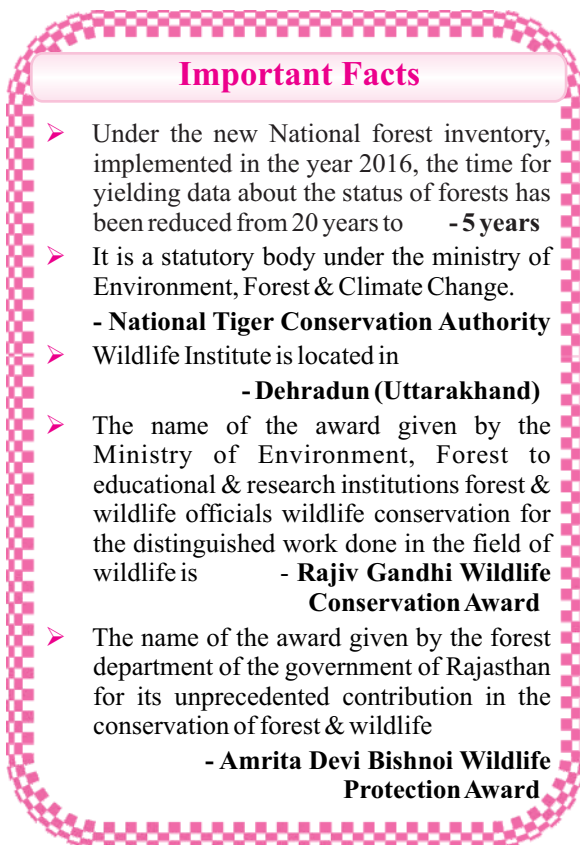
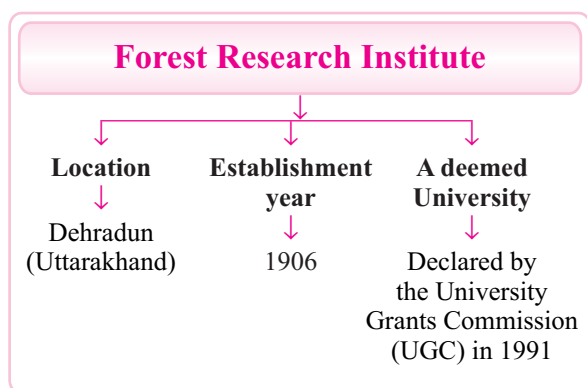
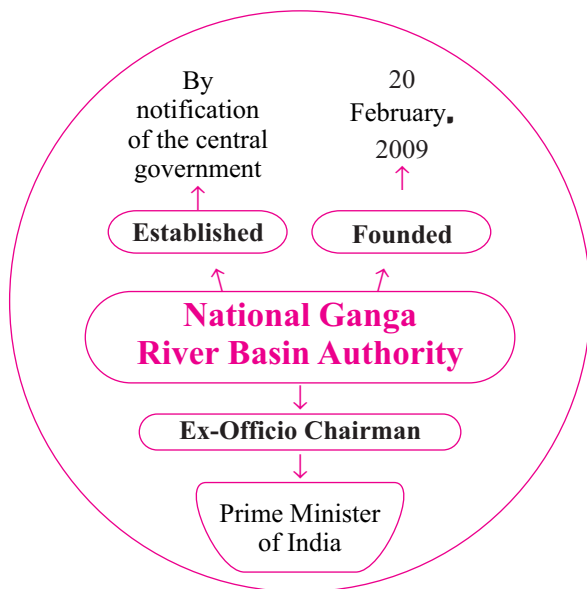
- Passed by the government of India
- **Enforced date** → 9 September, 1972
- **Objective** → Conservation and Protection from illegal hunting & smuggling
- **Provision** → Wildlife habitat protection
- **Special** → Gharial, Indian wild ass & wild buffalo, all three animals cannot be hunted by any person except under some provisions provided by law

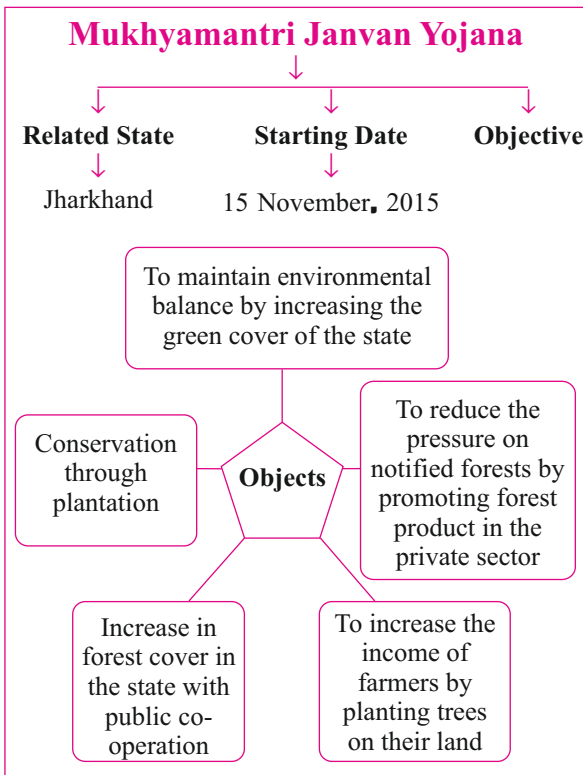
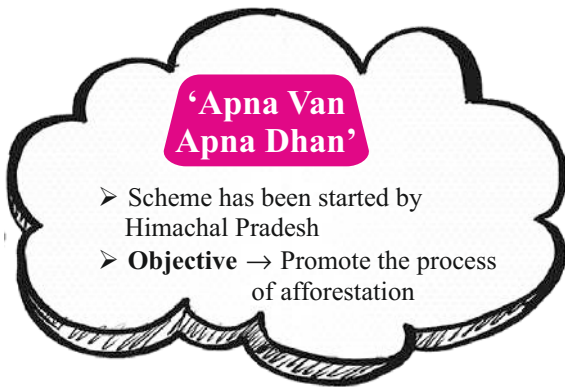
#### Forest (Conservation)

- **Enacted date** → 27 December, 1980
- **Came into force from** → 25 October, 1980

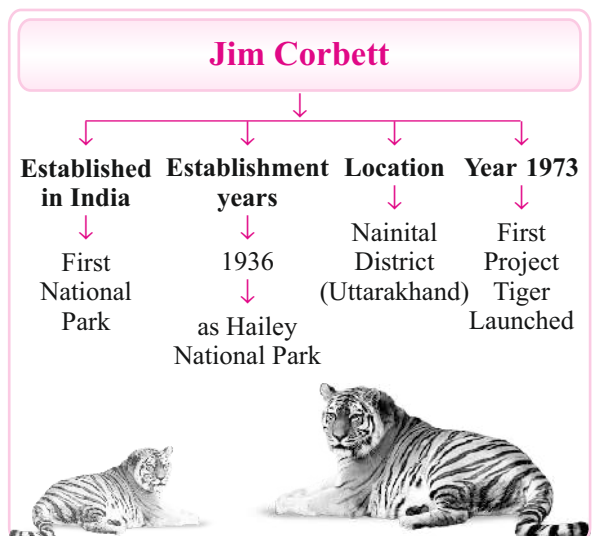
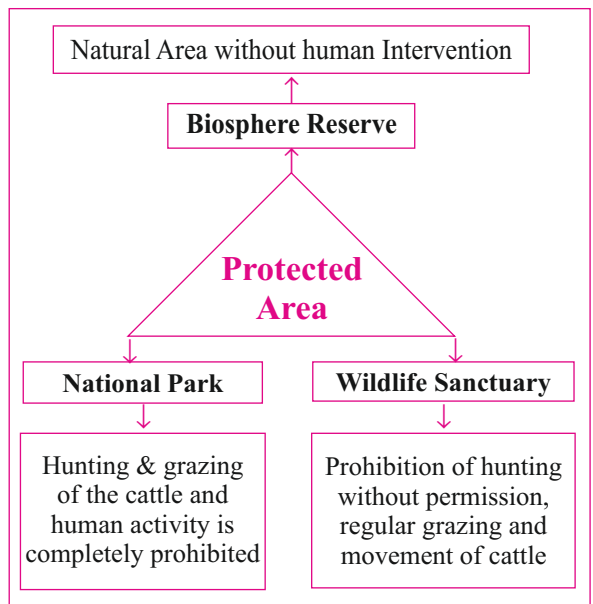
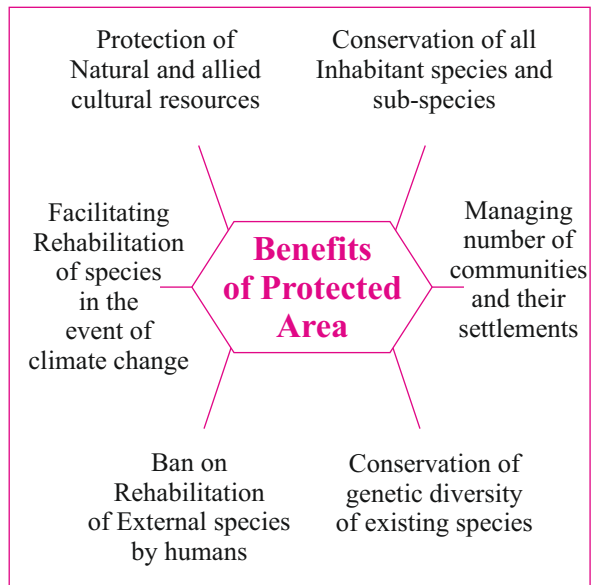
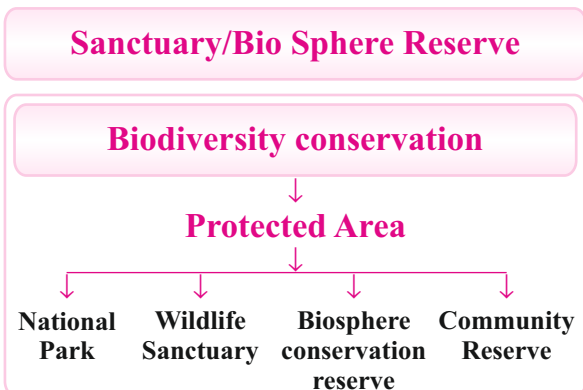
### National Bureau of Plant Genetic Resources (NBPGR)







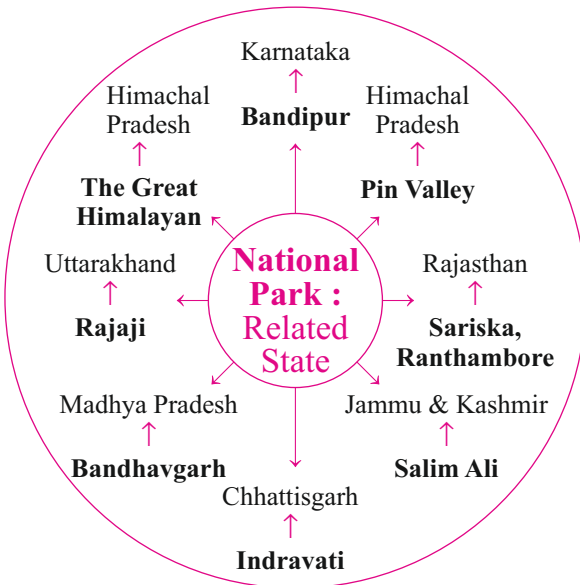
Schemes	Starting years
Project Tiger	1973
Project Elephant	1992





**Keoladeo National Park**

- **Year 1982** → Designated as a national park
- **Location** → Bharatpur district (Rajasthan)
- **Year 1985** → Listed in the World Natural Heritage Sites (by UNESCO)



**National Park : Related State**

- **Gulf of Mannar** ● Marine National Park  
● **Location** → Tamil Nadu
- **Namdapha** → Arunachal Pradesh
- **Buxa** → West Bengal
- **Nagarhole** ● Karnataka  
● **Other Name** → Rajiv Gandhi National Park
- **Betla** → Jharkhand
- **Gir** → Gujarat

Miscellaneous	
Bird Sanctuary	District
Nawabganj	Unnao
Okhla	Gautambudh Nagar
Samaspur	Raebareli
Parvati Arga	Jai Prakash Nagar (Gonda)

**Dudhwa National Park**

Lakhimpur kheri (U.P.)      First Rhino Rehabilitation Scheme started

↑      ↑

**Location**      **Year 1984**

↑      ↑

↓

At present

↓

Implementation of second rhino rehabilitation programme

**Important Facts**

- Dachigam National Park Established in the year 1981 is located in  
- **Jammu & Kashmir**
- The National Park that is famous for White Tigers - **Bandhavgarh National Park**
- The first National Park of the United States of America - **Yellowstone National Park**
- Nokrek Biosphere Reserve situated in  
- **Meghalaya State**
- Keibul Lamjao National Park which is the only floating park in the world is located in  
- **Manipur**

**Important National Park**

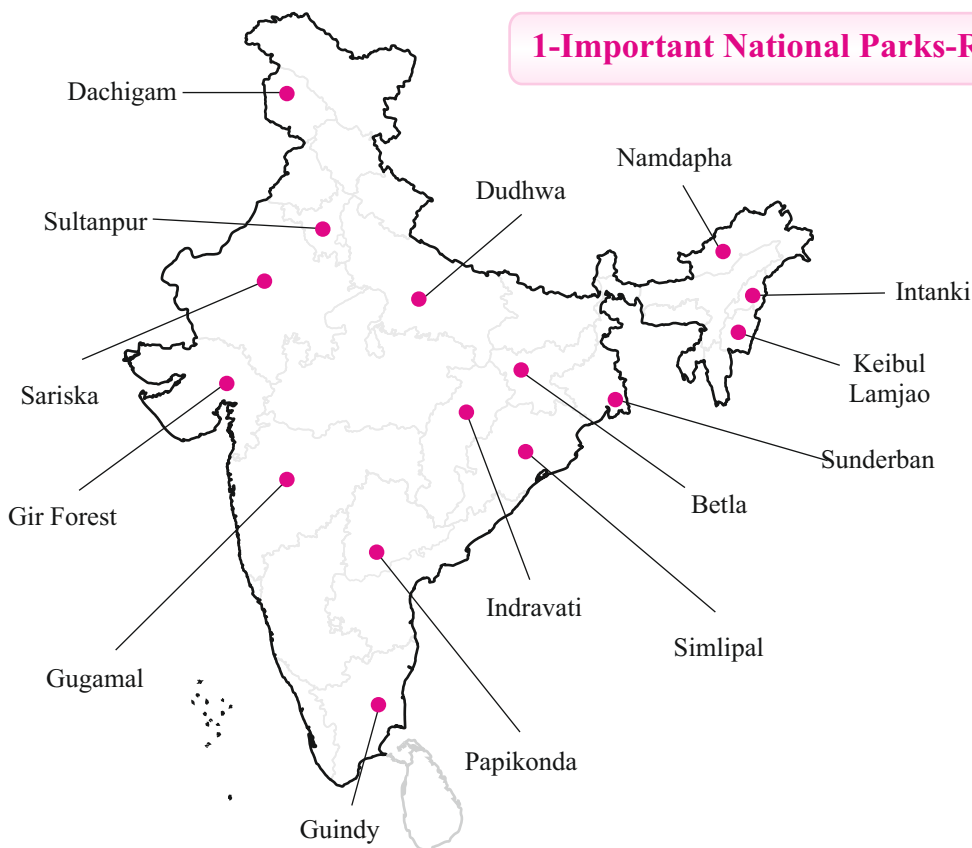
- **Eravikulam** → Habitat of Nilgiri Tahr
- **Periyar** → Major protected Wild Animal  
→ Tiger & Elephant
- **Keibul Lamjao** → Possessed of decomposed plants
- **Great Mahan Himalaya**  
→ Availability of brown bear
- **Keoladeo** → Migration of the Siberian crane in winter season

**Miscellaneous Facts**

- Natural habitat of great Indian hornbill is  
- **Western Ghat**
- India's first Butterfly park, Bannerghatta is located in  
- **Bangalore**
- The black coloured velvet winged butterfly, Blue Mormon was declared as the state butterfly  
- **By Maharashtra**
- The Southern Birdwing, the largest butterfly in South India was declared as the State butterfly  
- **By Karnataka**
- Golden Birdwing is the largest butterfly in India

## 1-Important National Parks-Related States

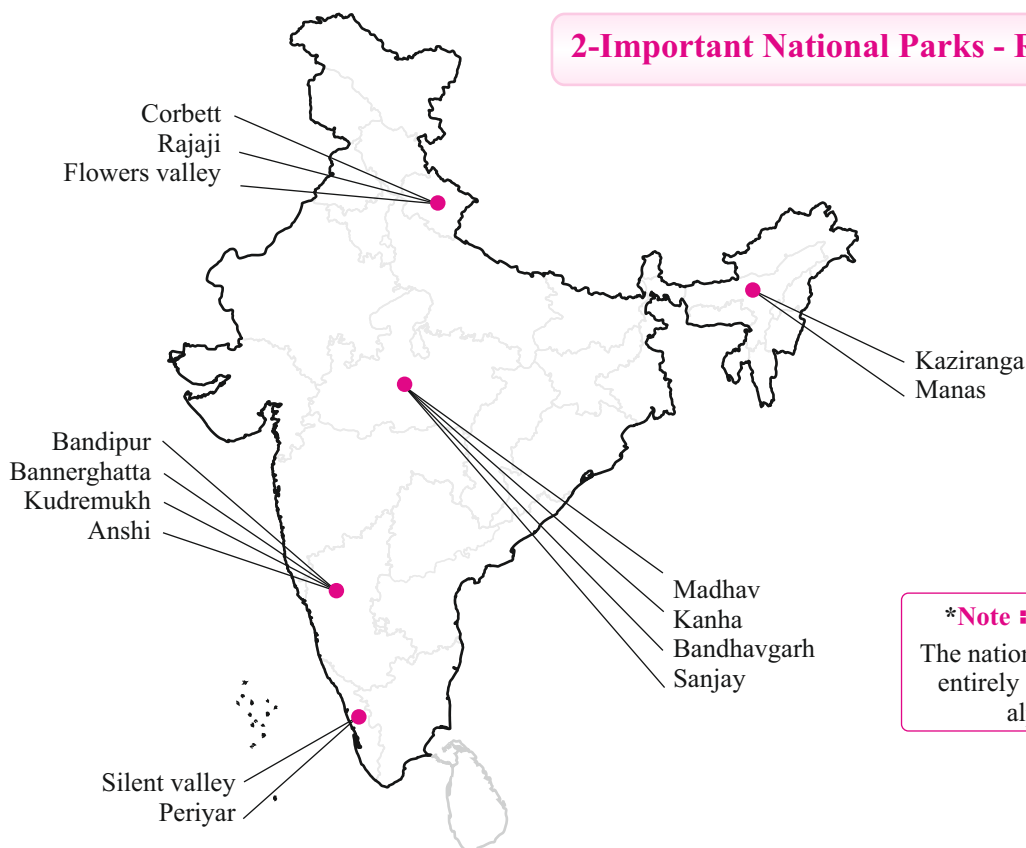
\*Map not to scale



**Note :** Indicated points indicate the respective state and not the actual location

## 2-Important National Parks - Related States

\*Map not to scale

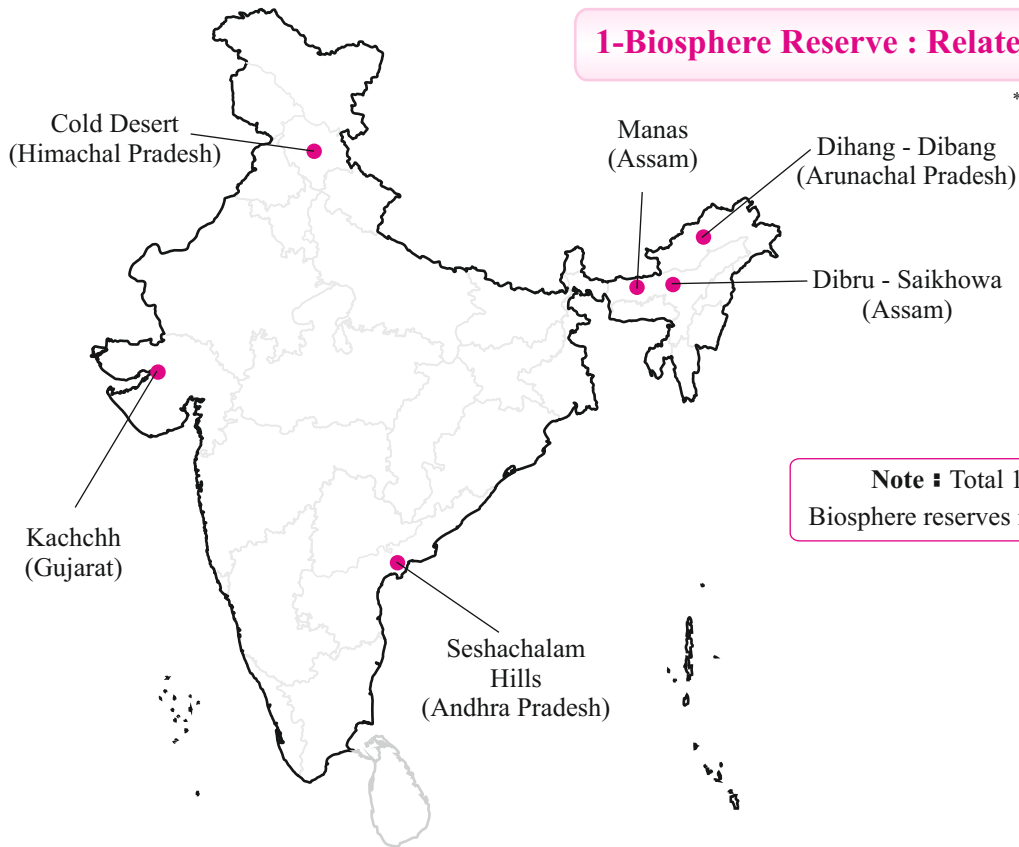


**\*Note : Flower Valley**

The national park is located entirely in the temperate alpine zone

## 1-Biosphere Reserve : Related States

\*Map not to scale

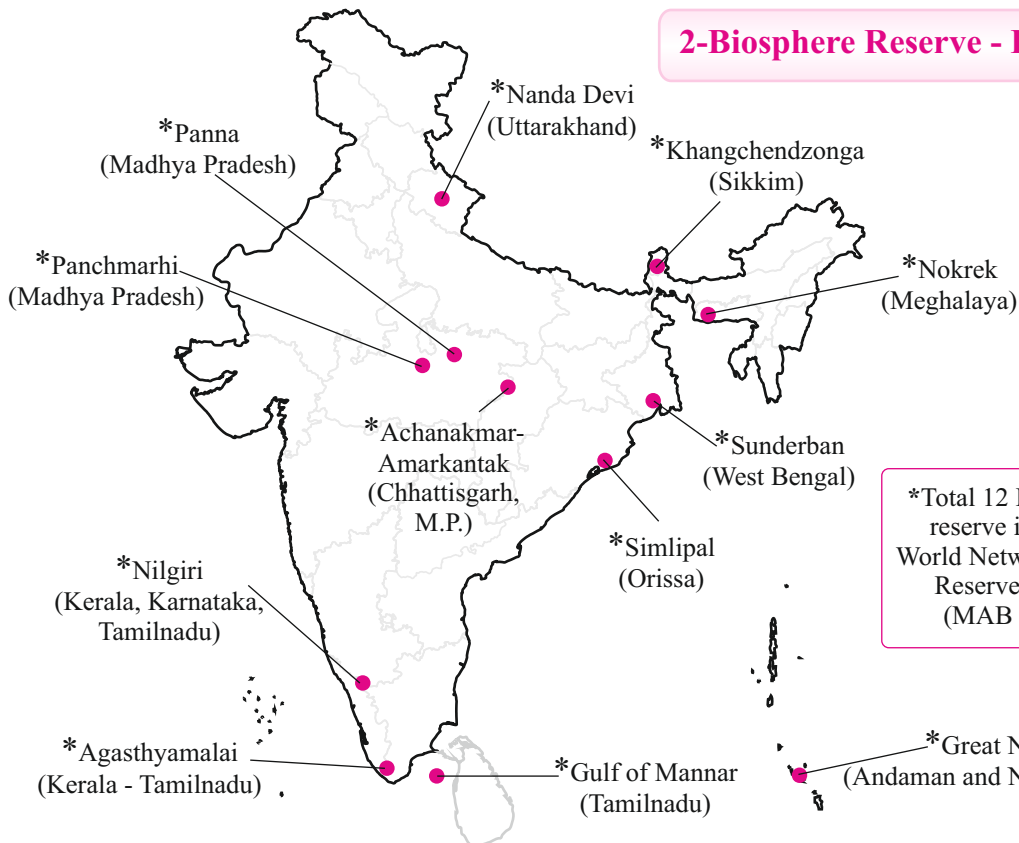


**Note :** Total 18  
Biosphere reserves in India

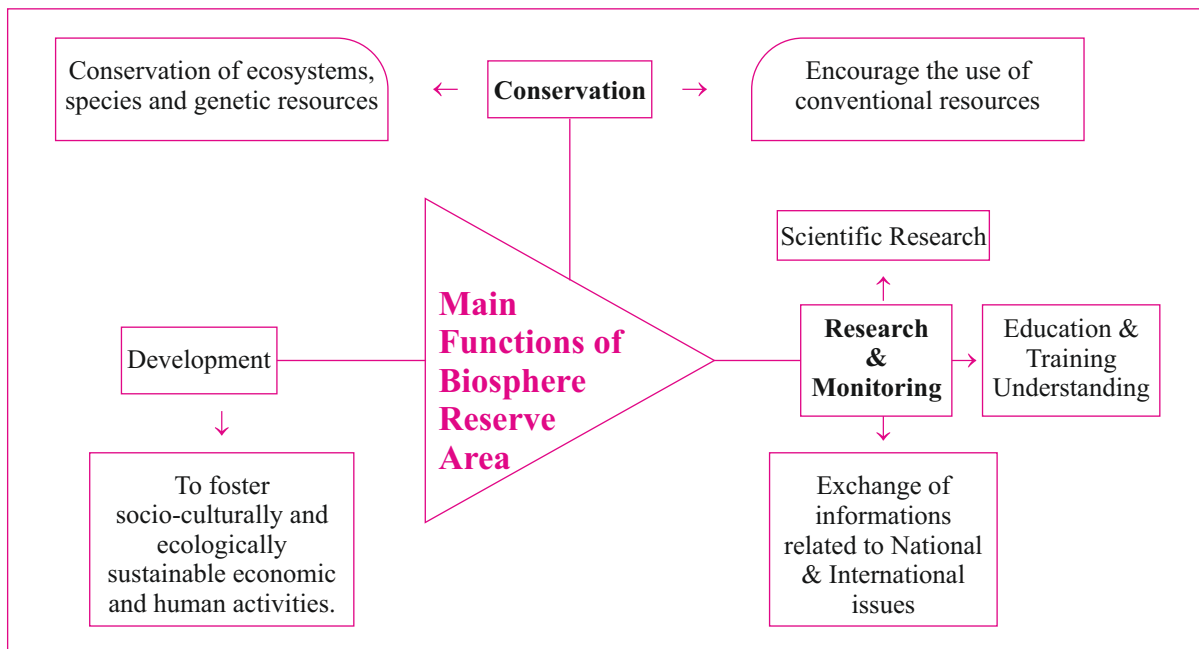
**Note :** Indicated points indicate the respective state & not the actual location

## 2-Biosphere Reserve - Related States

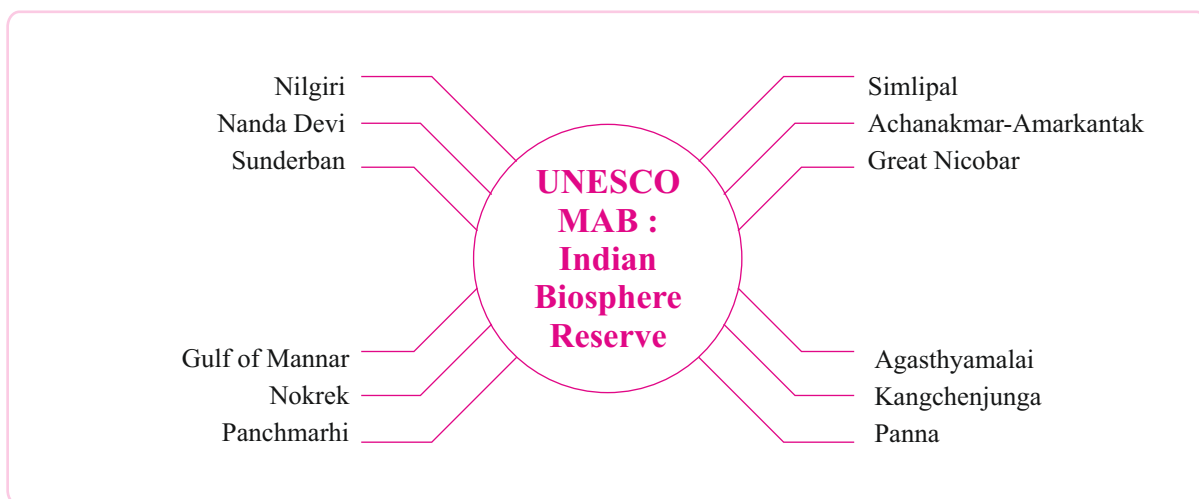
\*Map not to scale



**\*Total 12 Indian biosphere  
reserve included in the  
World Network of Biosphere  
Reserve by UNESCO  
(MAB programme)**



### Indian Biosphere Reserve enlisted in UNESCO MAB programme

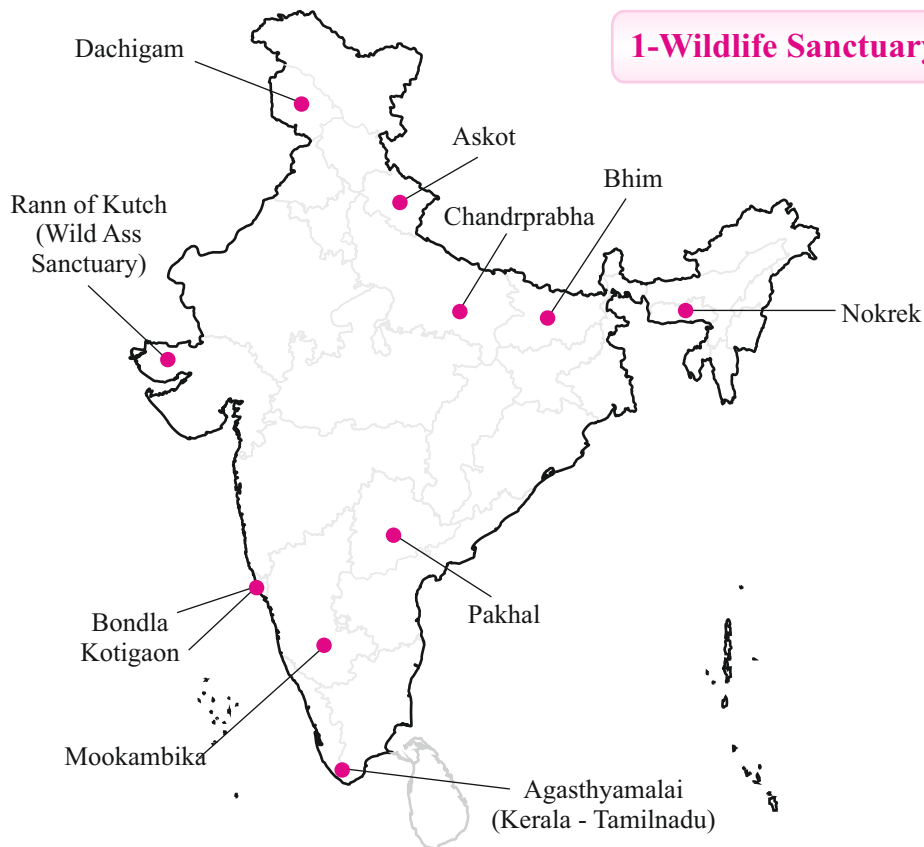


### Important Facts

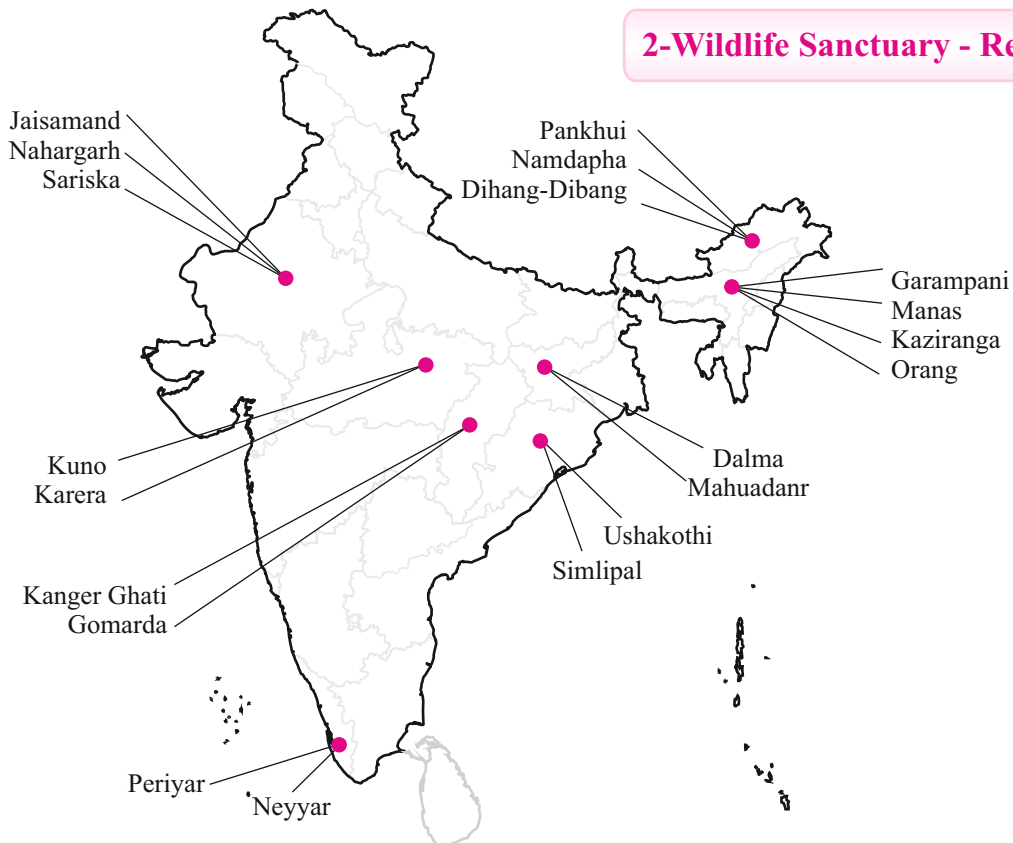
- The numbers of biosphere reserve established so far by the government of India is **- 18**
- The number of biosphere reserves of India included in the UNESCO world network is **- 12**
- The largest (in terms of area) biosphere reserve of India certified by UNESCO is **-Gulf of Mannar (Area-10500 km<sup>2</sup>)**
- India has the largest biosphere reserve in terms of Area **-Rann of Kutch (Gujarat) (Area - 12454 Km<sup>2</sup>)**

### MAB

- **Beginning Year** → 1971
- Intergovernmental scientific programme of UNESCO
- **Full Name**
  - ↓
  - Man and the Biosphere Programme
- **Objective** → Establish a scientific basis for improving the relationship between people & their Environment



**Note :** Indicated Points Indicate the respective state and not the actual location





## Project Tiger

### Project Tiger

- **April, 1973** → Launching Date
- **Objective** → Save Tigers from Extinction
- **2967** → Total number of tigers in India (Tiger census report, 2018)
- **52** → Number of protected Areas

- **Note :** The decision to observe 29th July every year as 'International tiger day' was taken at the St. Petersburg tiger conference held in the year 2010.
- The state with the largest number of tigers in India is **-Madhya Pradesh**
- India's largest tiger habitat is found in **-Nagarjunasagar-Srisailem tiger reserve (Andhra Pradesh - 3296.31 Km<sup>2</sup>)**
- **Note :** Bandipur (Karnataka) tiger reserve has started using unmanned aircraft (drones) for wildlife management.
- It is the national park of India which is also a tiger reserve whose climate varies from tropical to sub-tropical, temperate and Arctic **-Namdapha (Arunachal Pradesh)**

## Miscellaneous

### Royal Botanic Garden

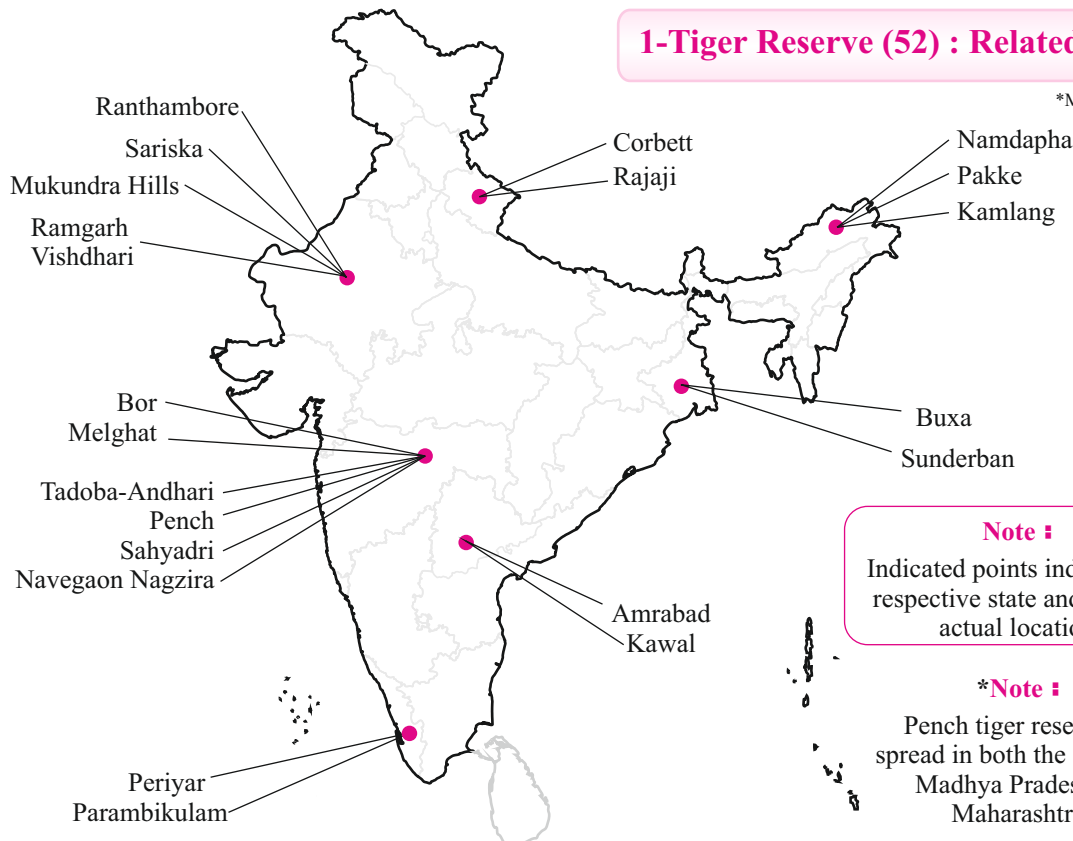
- **Location** → Kew (England)
- **Founded** → 1759 AD
- **Year 2003** → Declared a world heritage site (UNESCO)
- **Special** → More than 40,000 species (of Plants)  
→ World's largest botanical garden

### Sathyamangalam Tiger Reserve

- **Location** → At the junction point of the Eastern and Western ghats
- **Other Animals** → Elephant, Hyenas, Leopard etc.
- **Special Facts** → Largest wildlife sanctuary in Tamilnadu

## 1-Tiger Reserve (52) : Related States

\*Map not to scale

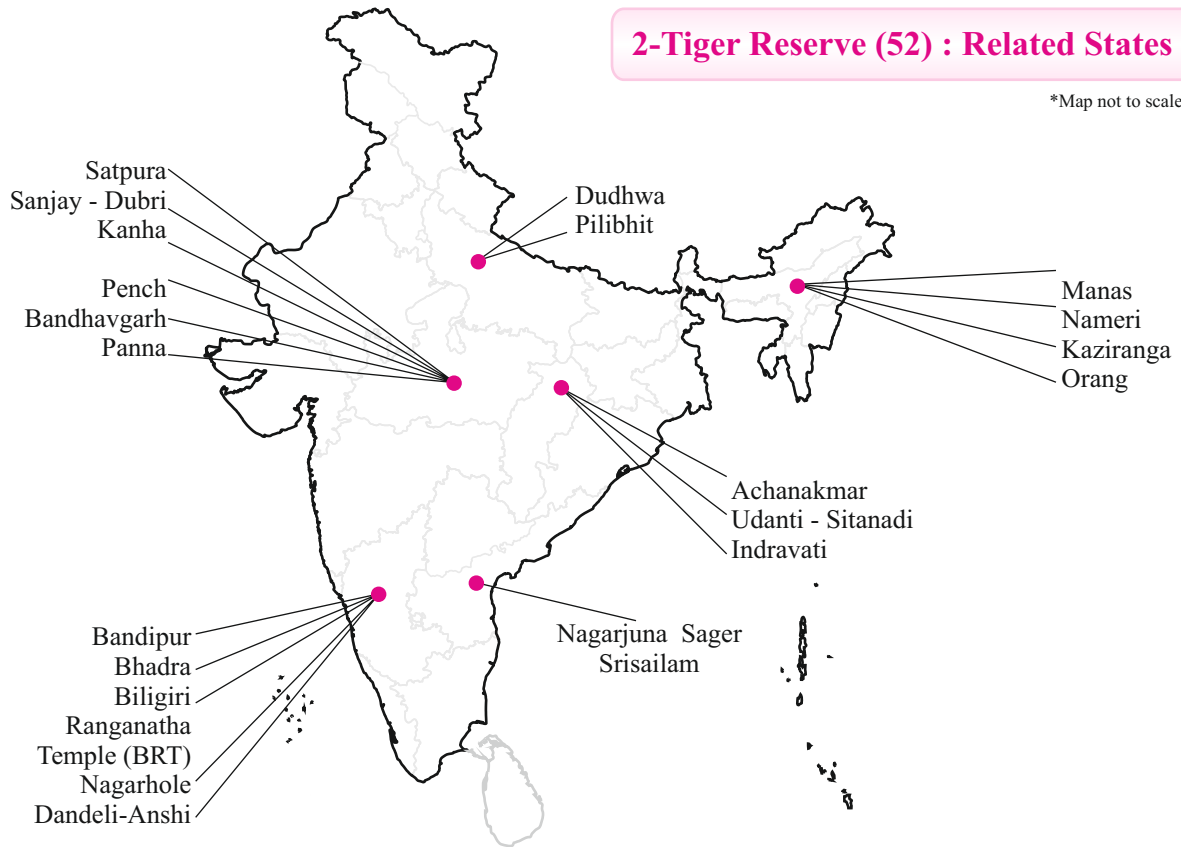


**Note :**  
Indicated points indicate the respective state and not the actual location

**\*Note :**  
Pench tiger reserve is spread in both the states of Madhya Pradesh & Maharashtra

## 2-Tiger Reserve (52) : Related States

\*Map not to scale



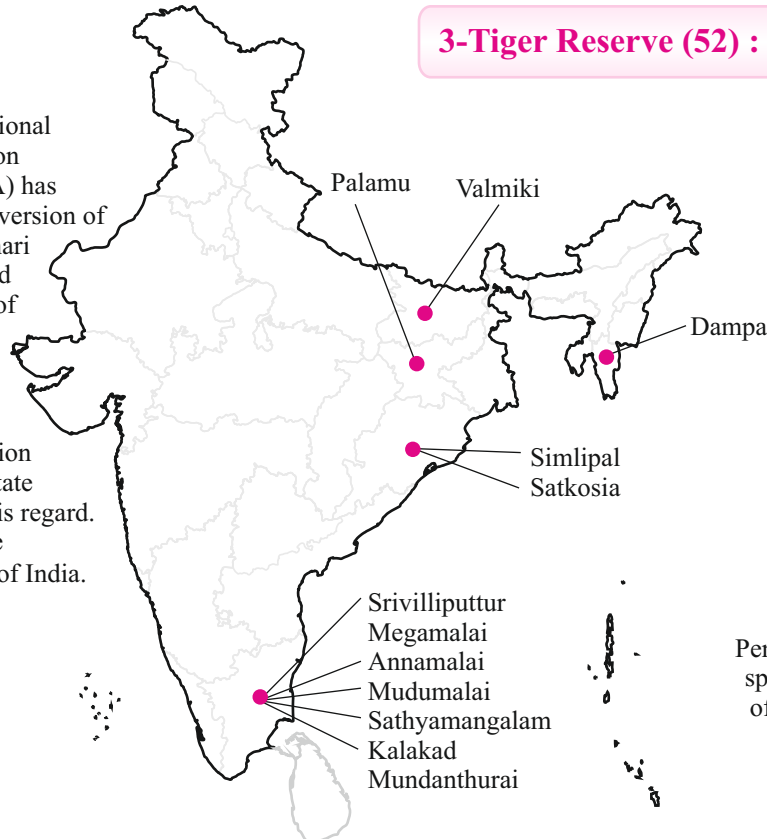
**Note :** Indicated points indicate the respective state & not the actual location

## 3-Tiger Reserve (52) : Related States

\*Map not to scale

### \*Note :

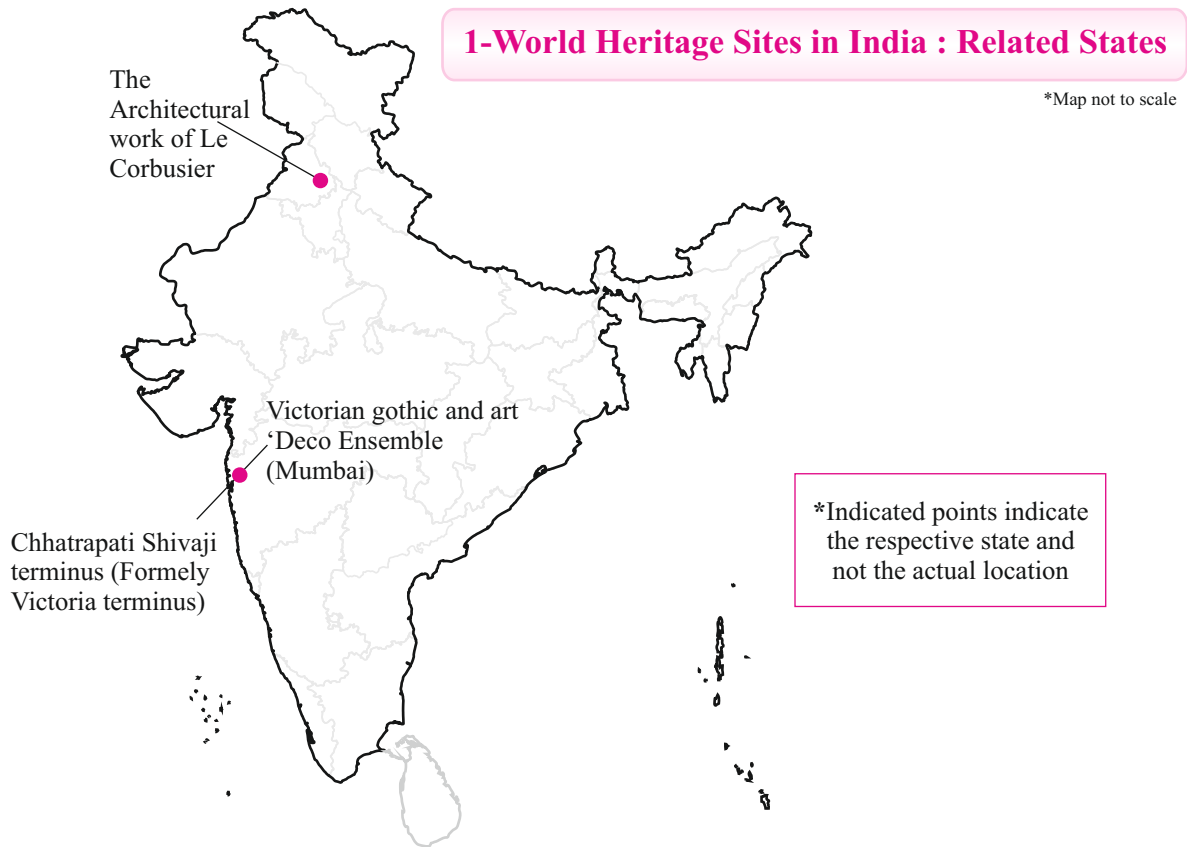
Recently, the National Tiger Conservation Authority (NTCA) has approved the conversion of 'Ramgarh Vishdhari Sanctuary' located in Bundi district of Rajasthan as the fourth tiger reserve of the state the notification is issued by the state government in this regard. With this, it is the 52<sup>nd</sup> tiger reserve of India.



### \*Note :

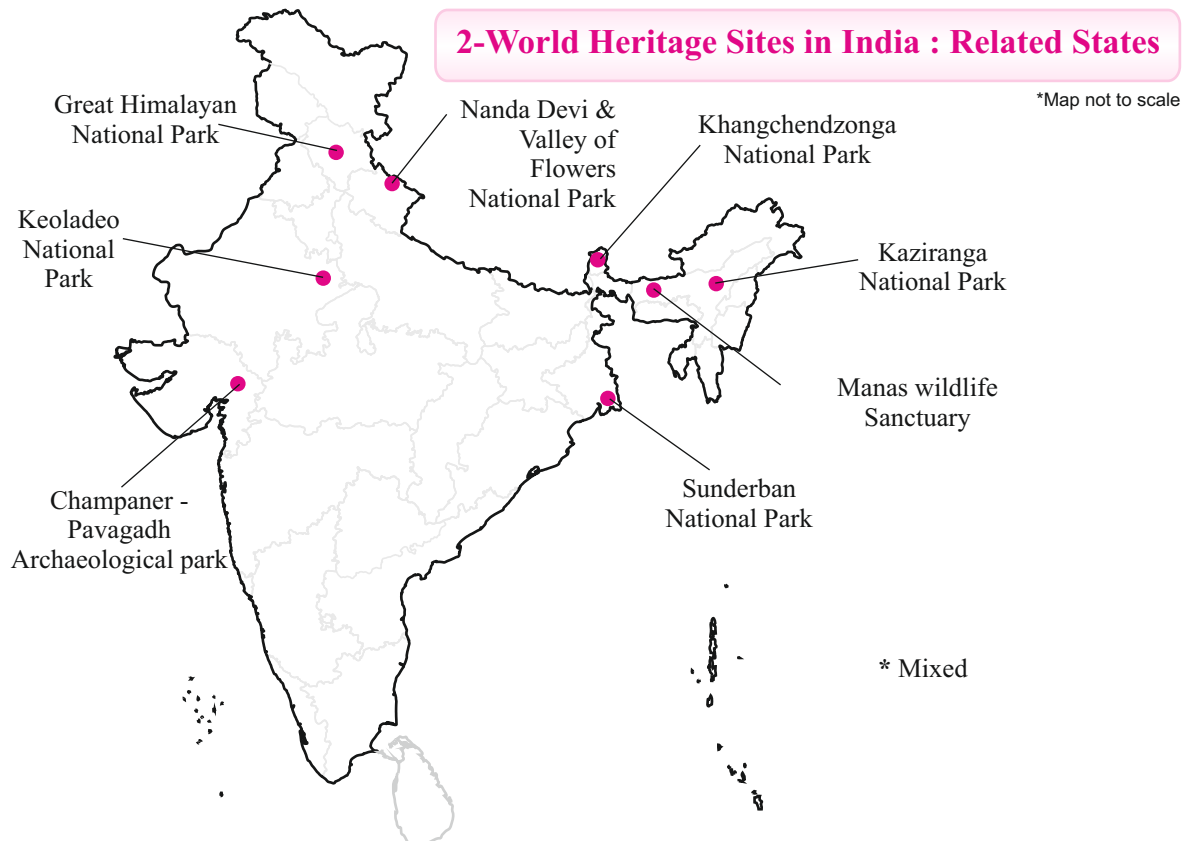
Pench Tiger reserve is spread in both states of Madhya Pradesh & Maharashtra

## 1-World Heritage Sites in India : Related States



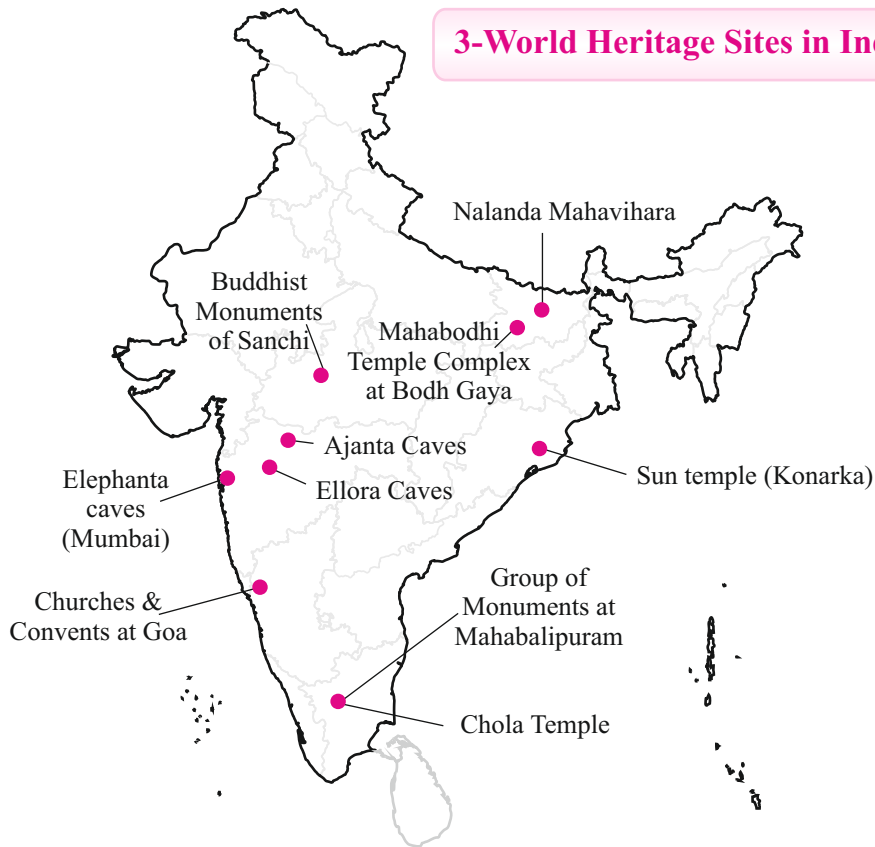
**Note :** Indicated points indicate the respective state and not the actual location

## 2-World Heritage Sites in India : Related States



### 3-World Heritage Sites in India : Related States

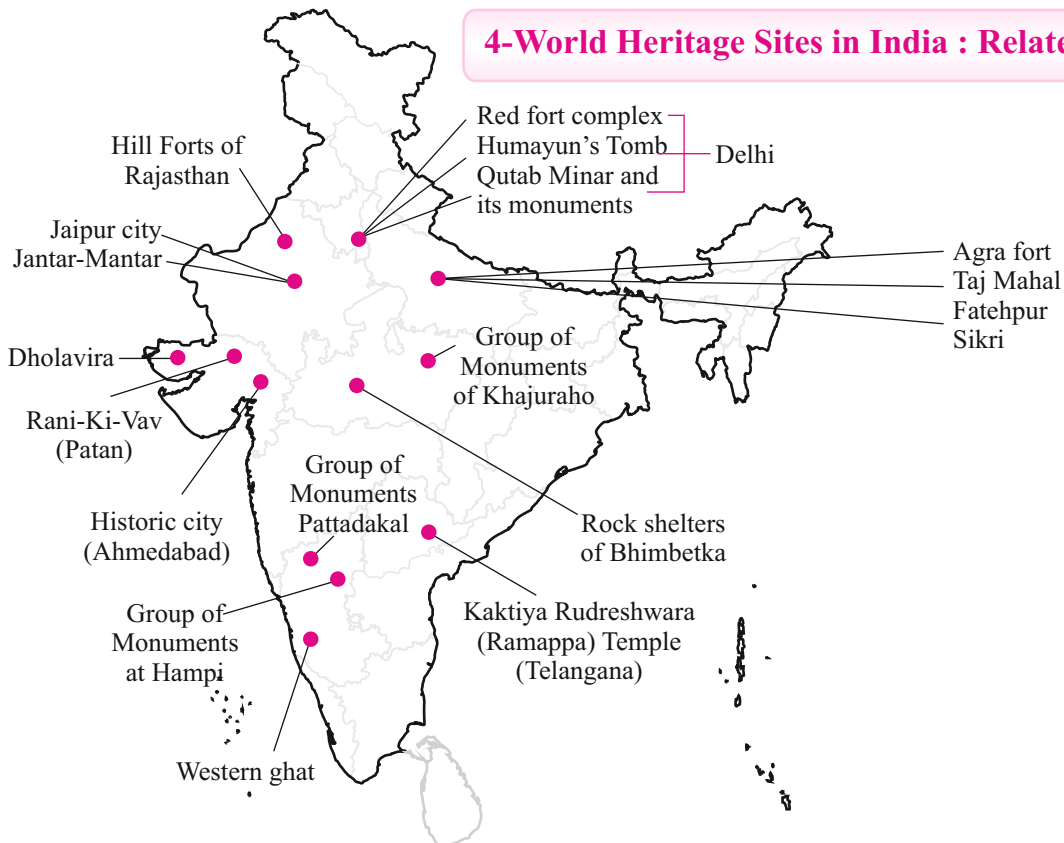
\*Map not to scale



**Note :** Indicated points indicate the respective state and not the actual location

### 4-World Heritage Sites in India : Related States

\*Map not to scale



### Important Facts

- The first Marine Wildlife Sanctuary was created in India - **Gulf of Kutch(1980)**
- Corbett National Park receives water from - **Ramganga River and Kosi River**
- Chinnar wildlife sanctuary is located in - **Kerala State**
- The Harike wetland is located in the Punjab province  
- **At the confluence of Beas and Sutlej**
- **Note :** The Garden of five senses is located near Mehrauli.

### Alternative Energy

#### Energy Resources

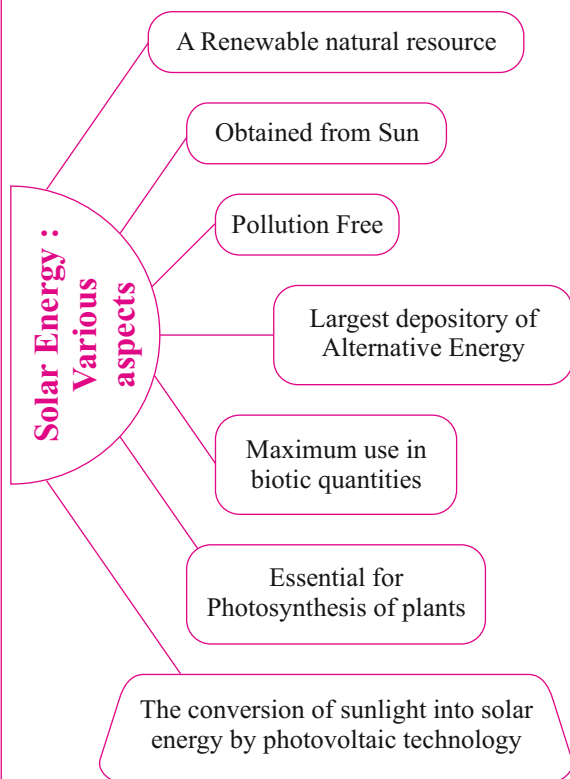
Renewable Energy Resources	Non-Renewable Energy Resources
<ul style="list-style-type: none"> <li>● Solar Energy</li> <li>● Wind Energy</li> <li>● Hydro Electric</li> <li>● Bio gas</li> <li>● Geo-thermal</li> <li>● Energy from waste</li> <li>● Tidal Energy</li> </ul>	<ul style="list-style-type: none"> <li>● Coal</li> <li>● Petroleum</li> <li>● Natural Gas</li> <li>● Atomic Energy</li> <li>● Shale Gas</li> </ul>

### Energy and Energy Resources

#### Important Facts

- The energy obtained through natural process continuously is called - **Renewable Energy**
- That form of energy which is neither a polluting factor nor it has adverse effect on natural resources - **Renewable Energy**
- Those products of plants which were buried under the earth for thousands of years or those fossils of plants which we use as fuel are called  
- **Fossil Fuels**
- **Note :** Fossil fuels are currently the main sources of Energy, once they are used they can't be recovered, the danger of exhausting fossil fuels like crude oil & natural gas is called energy crisis.

### Alternative Energy



Hot water supply to residential buildings

Railway Signals

#### Uses of Solar Energy

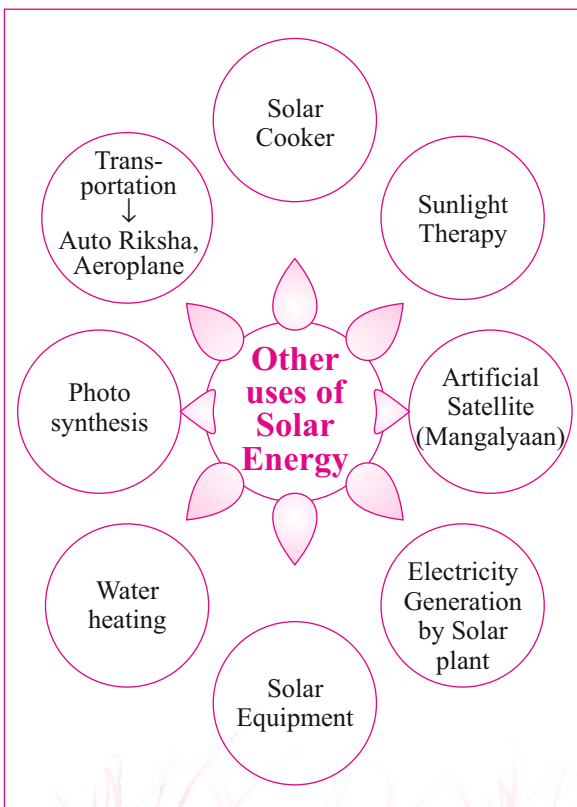
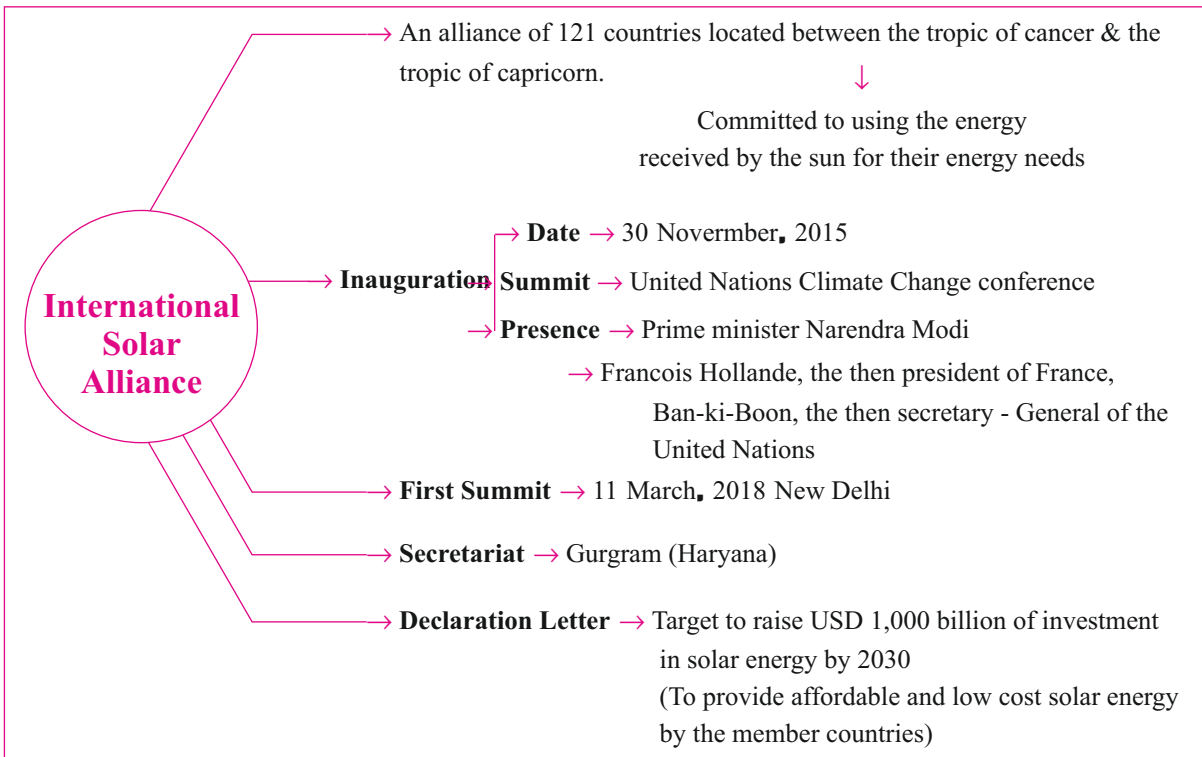
Street Lighting

Water supply for minor irrigation projects

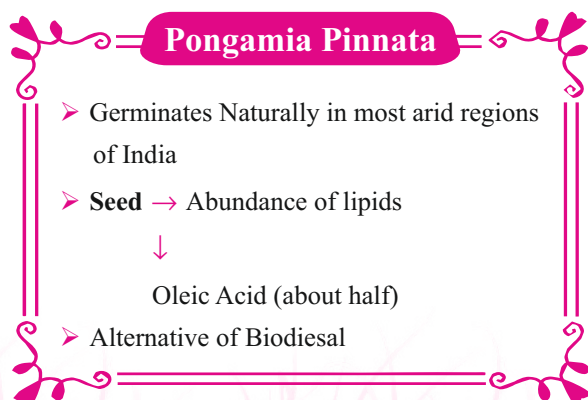
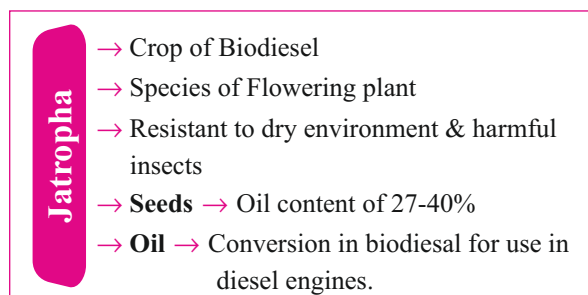
### Important Facts

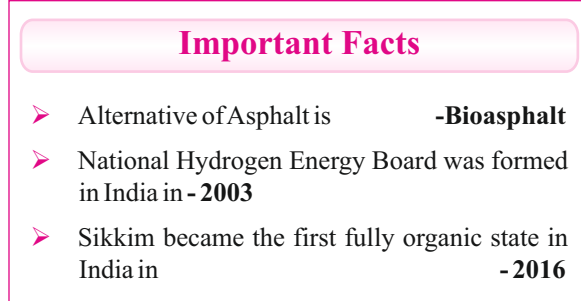
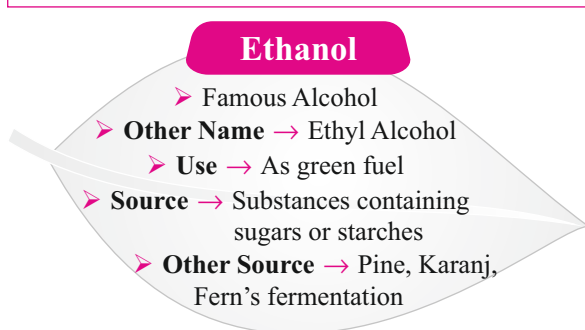
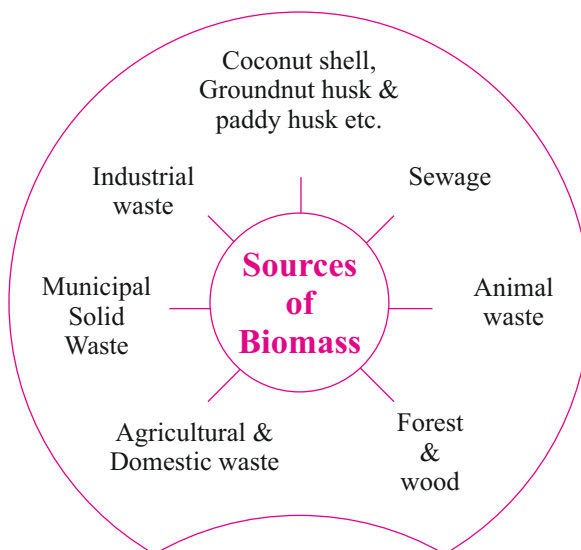
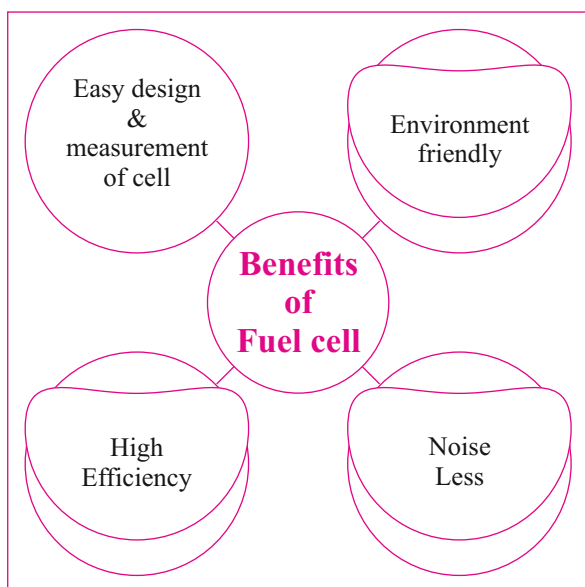
- The world's first fully solar powered international airport approved by the United nations Environment Programme is located in  
- **The Kochi (Kerala)**
- In the year 2018, first union territory to run entirely on solar energy  
- **Diu**
- Conversion of solid biomass into combustible gas mixture by thermo - chemical change is called  
- **Biomass Gasification**



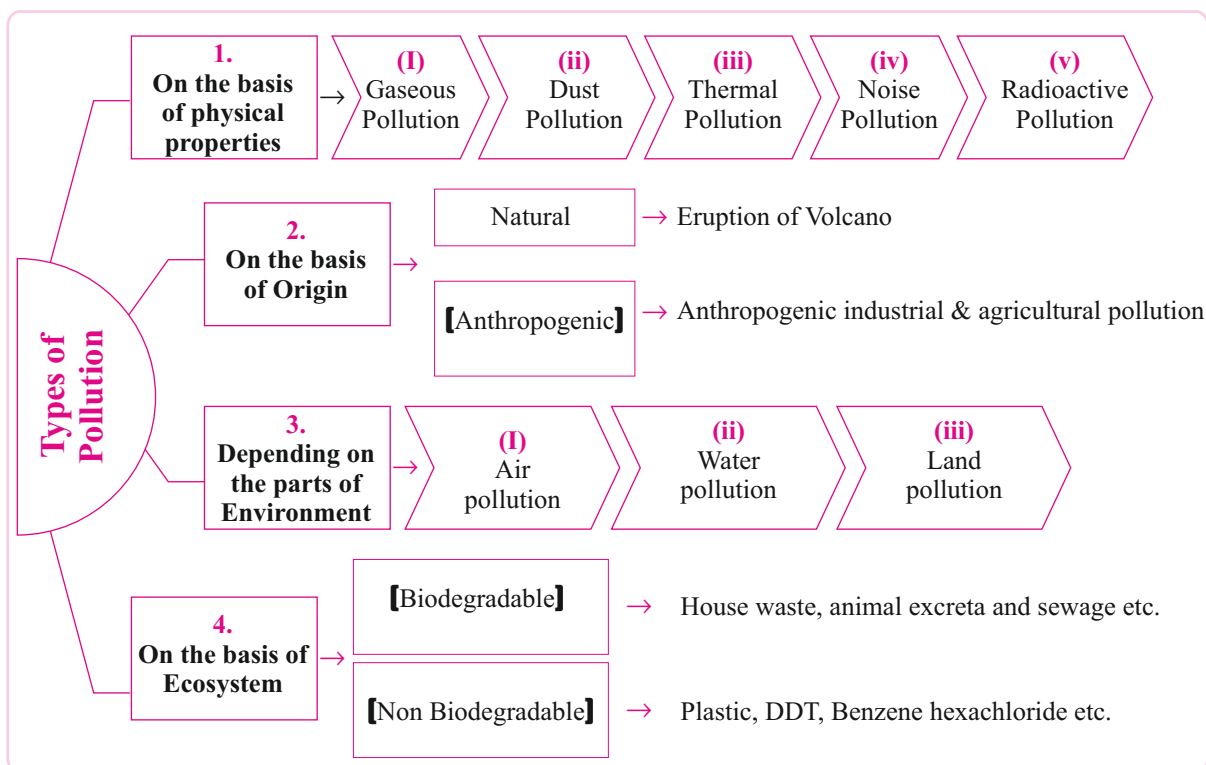


## Biodiesel





## Pollution



## Pollution

- **Definition** → Pollution occurs as a result of unexpected change in physical chemical and biological characteristics of soil, water & air
- **Pollutants** → Substances that cause pollution
- **Anthropogenic** → Human effect on nature
- **Anthropogenic Environment** → Environment changed by human activities
- **Anthropogenic Pollution** → Pollution caused by human

## Air Pollution

### Definition

- Undesirable changes in a certain proportion of the gases present in the atmosphere (causes due to toxic gases or particulate matter)
- **Sources -**
  - **Natural Sources** → Forest Fire  
Volcanic eruptions, decomposition of organic matter.
    - Sulphur dioxide [SO<sub>2</sub>]
    - Nitrogen's oxide (NO<sub>x</sub>)
  - **Man-made Sources**
    - Gases & smoke
    - Particulate Matter
    - Heat (by burning of Fuel)

## PAN

- **Full Name** → Peroxyacetyl nitrate
- **Damage to Chloroplasts**
  - Reduced ability of photosynthesis & growth of plants
- This hinders electron transport chain (ETC) occurring in mitochondria of the cell
  - Adverse effects on the enzyme system
  - Irritation/Excitability in human eye

## Air Pollution

### Primary Air Pollutants

Mixing directly into the air from the pollutant source  
[Example → CO, CO<sub>2</sub>, SO<sub>2</sub> etc.]

### Secondary Air Pollutants

Promotion as a result of the action of primary air pollutants and ordinary atmospheric substances (Example- Smog, Ozone, PAN etc.)

## Lead

- Burning of petrol in vehicles releases lead
  - Air pollutant
- Used as an anti-knocking agent in engines
- Petrol due to technological up-gradation in the refinery



Lead free

- Obstructs development of the brain in children, Causes of cardiovascular and respiratory diseases in adults.

## Photochemical Smog

→ **English Name** → Smog → Smoke  
Fog

→ A state of air pollution

→ Smoke present in the waste generated from automobiles & industries



Nitrogen oxide & Nitrogen dioxide



In the presence of sunlight



Reaction with hydrocarbons



Generation of secondary pollutants (Ozone, formaldehyde & PAN (Peroxyacetyl nitrate) etc.)

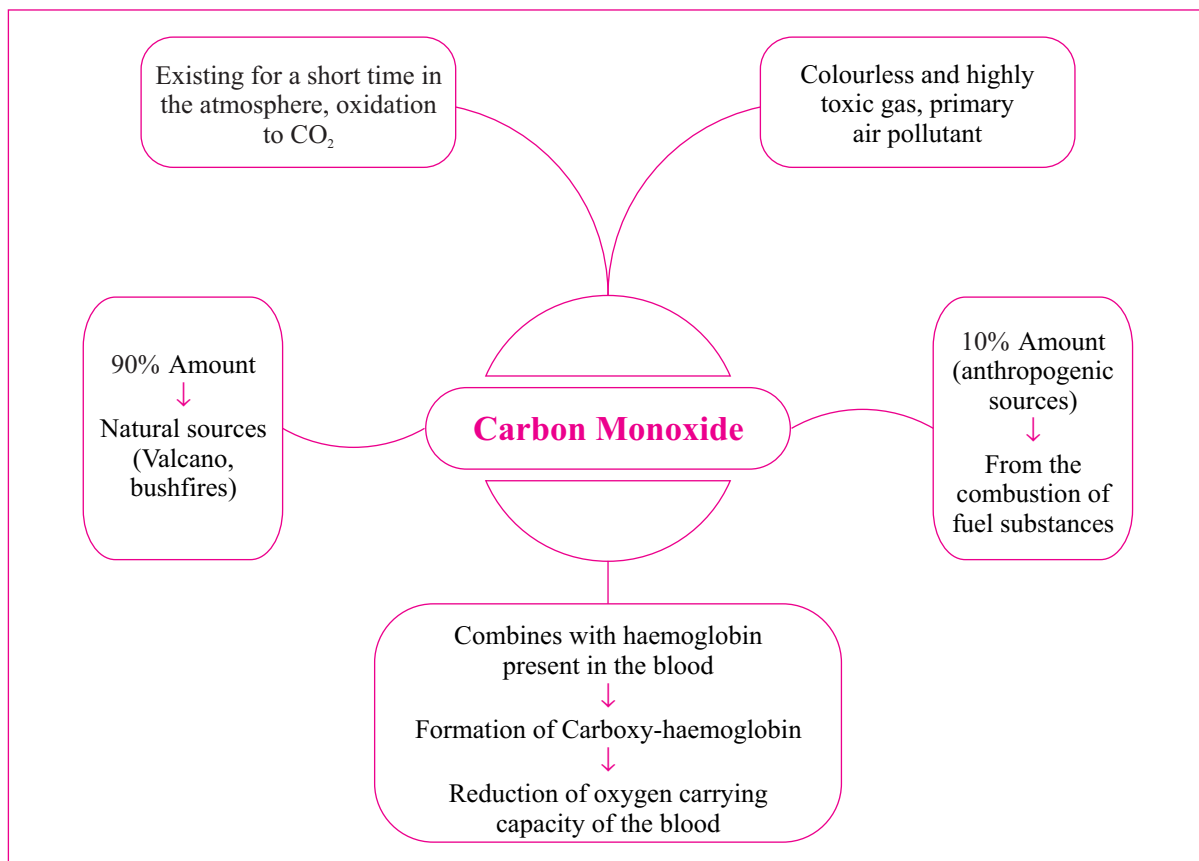
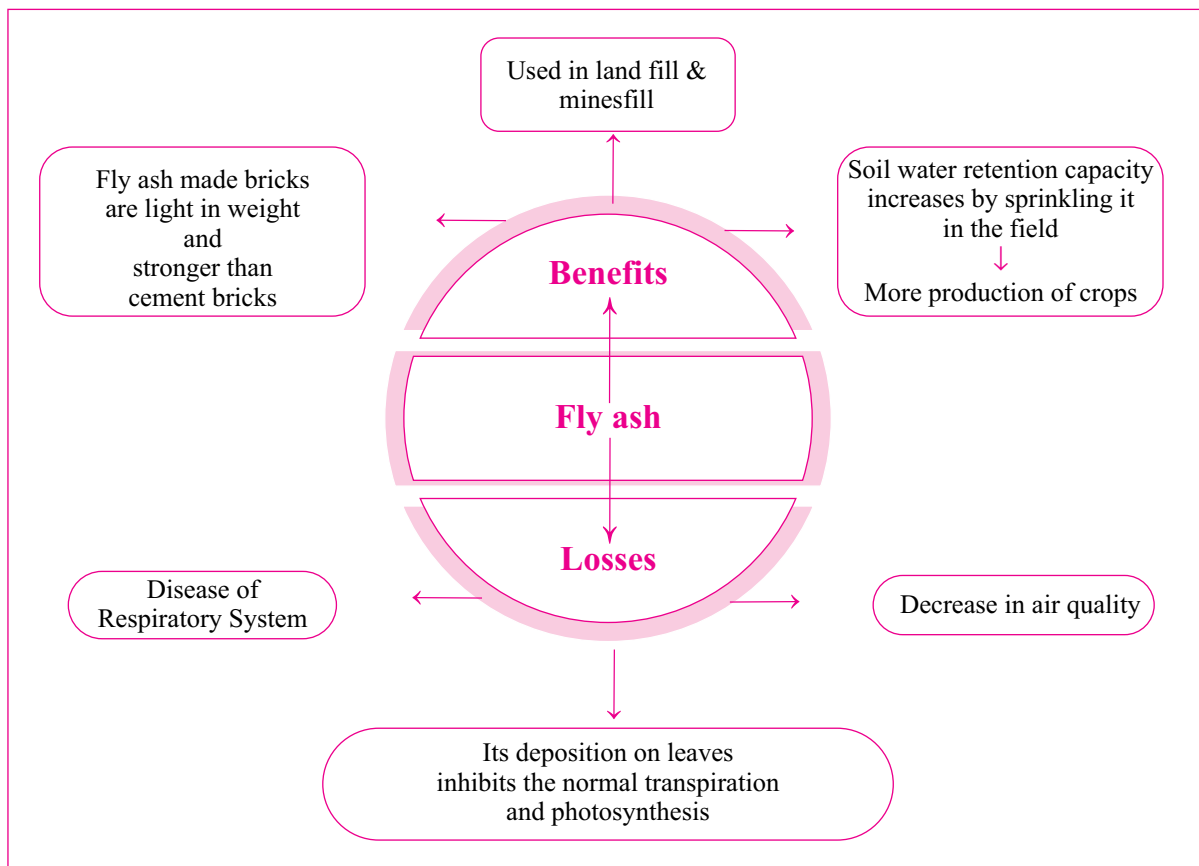


This creates photochemical smog formed especially from

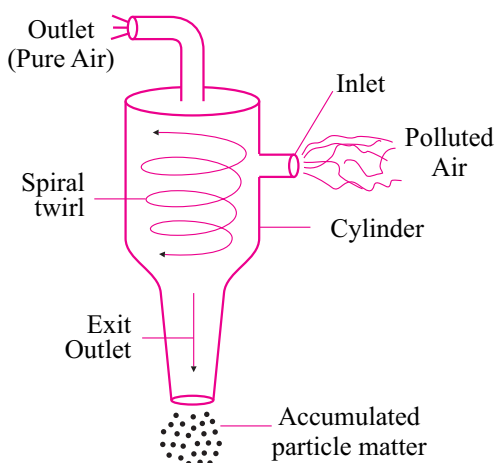


Oxides of Nitrogen (NO<sub>x</sub>), ozone (O<sub>3</sub>) & Peroxyacetyl nitrate (PAN)

### Product



## Cyclone Separator



## Exam Vision

- The Asiatic brown cloud contains trace amounts of aerosols **-about 85 percent**
- Under normal condition, the polluting gas in the atmosphere is **-Carbon monoxide**
- It acts as a biological indicator of air pollution **-Lichen**
- Pollutants that are decomposed into simpler, harmless substances in nature over time by microorganisms (bacteria etc.) **-Biodegradable Pollutants**
- The major pollutant found in cigarette smokes is -
  - Carbon Monoxide
  - Hydrogen Cyanide
  - Nitrogen Oxide
  - Benzene

## Fly ash

- Received as a by-product with the result of power generation from coal based power plants
- **Components**
  - Silicon Dioxide
  - Aluminium oxide
  - Ferric oxide
  - Calcium oxide
- **Uses**
  - In the production of Bricks
  - In the production of concrete

} As a substitute of Portland cement
- **Adverse Effect**
  - Respiratory diseases
  - Inhibits photosynthesis by depositing on the leaves of plants

## Important Note

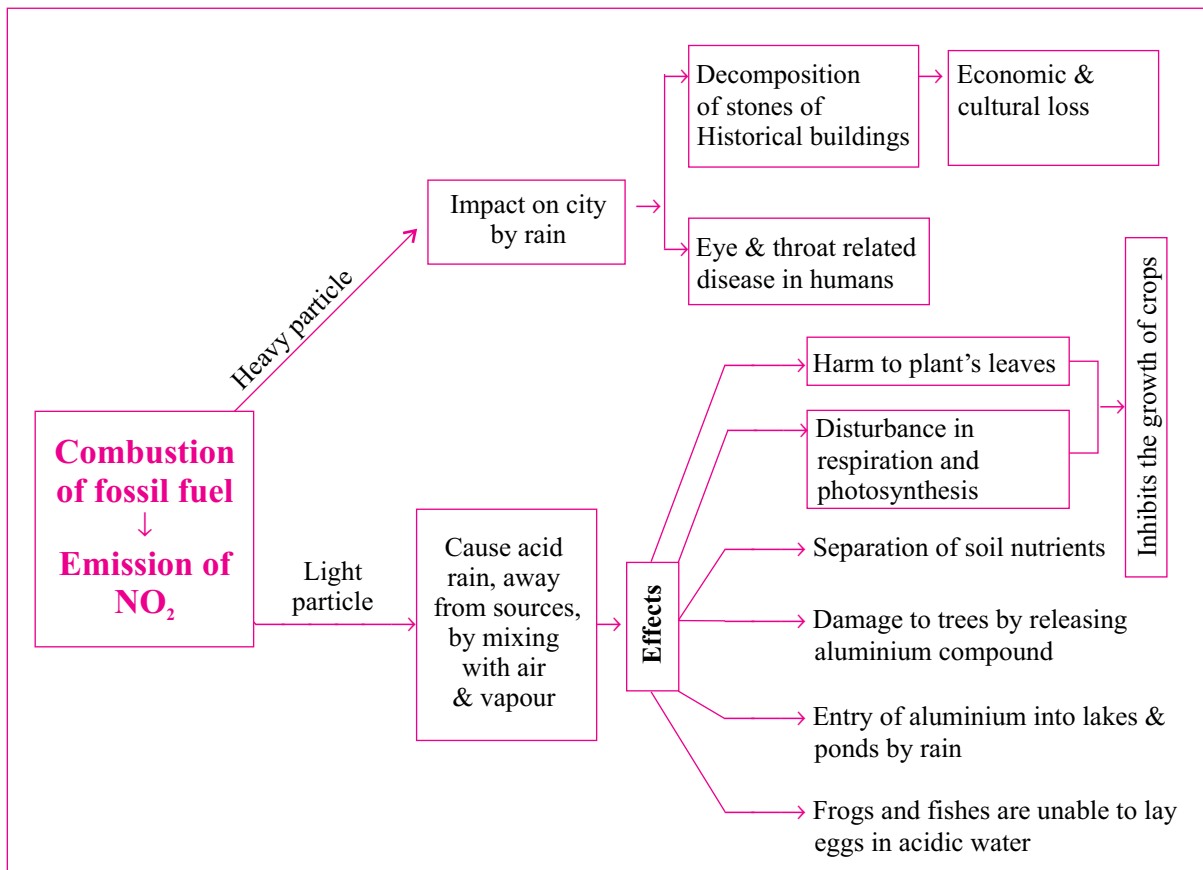
- Internationally, efforts are being made to reduce sulphur emission under the Helsinki protocol (1985)
- The acid rain caused due to the emission from Mathura oil refineries in harming the beauty of Taj Mahal.
- Norway & Sweden receive more acid rain due to  $\text{SO}_2$  & nitrogen oxides emitted from mill located in Germany and United Kingdom
- Acid rain is called as the Lake killer
- The acid rain information center has been established in Manchester, England

## Radon Gas

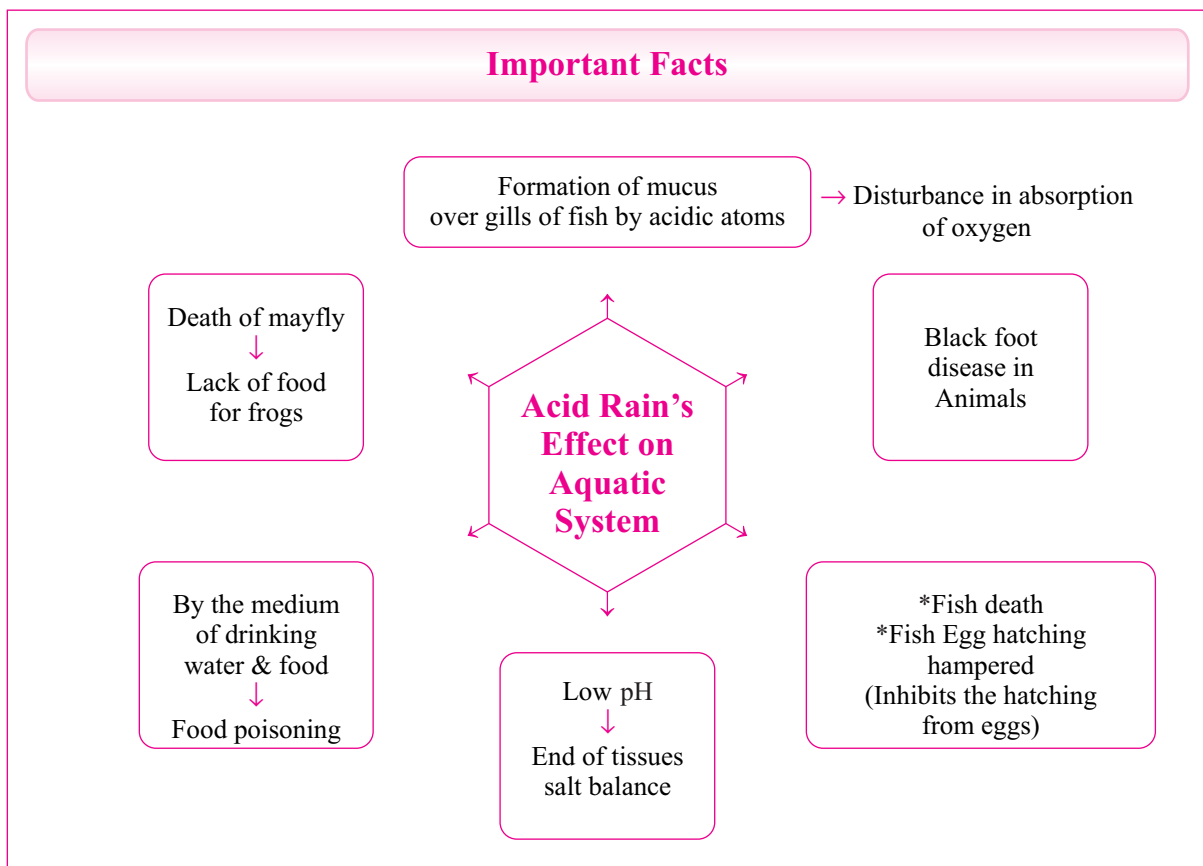
- Most Important pollutant of indoor air pollution
- Colourless, odourless, radioactive inert gas
  - Emission from Radium
  - **Adverse Effects**
    - Lungs cancer
    - Blood cancer
  - Emission from the soil naturally

## Other Related Facts

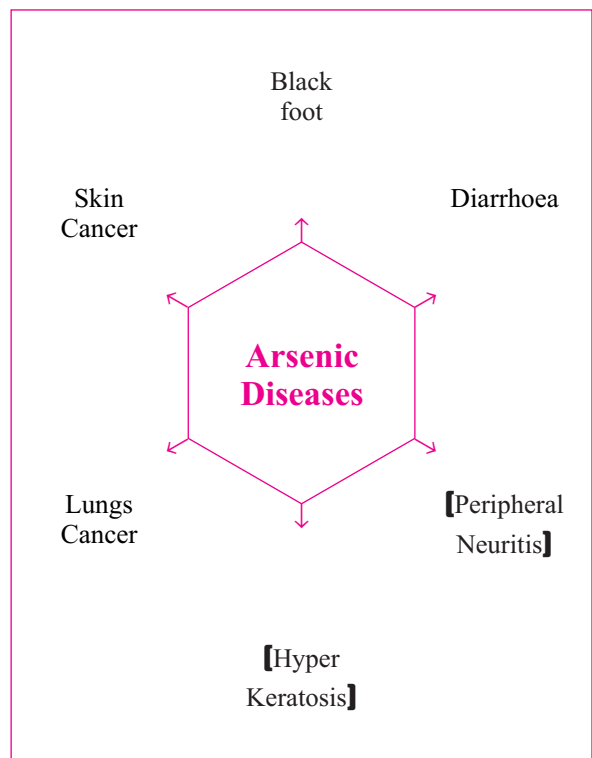
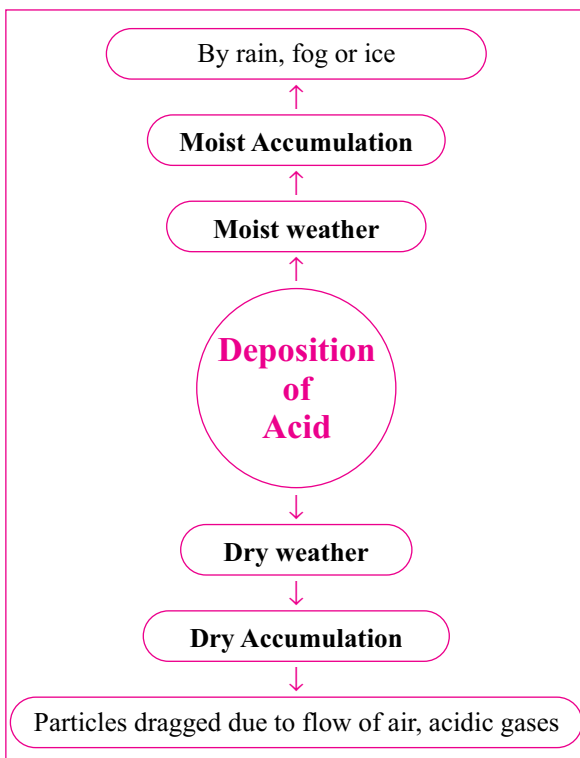
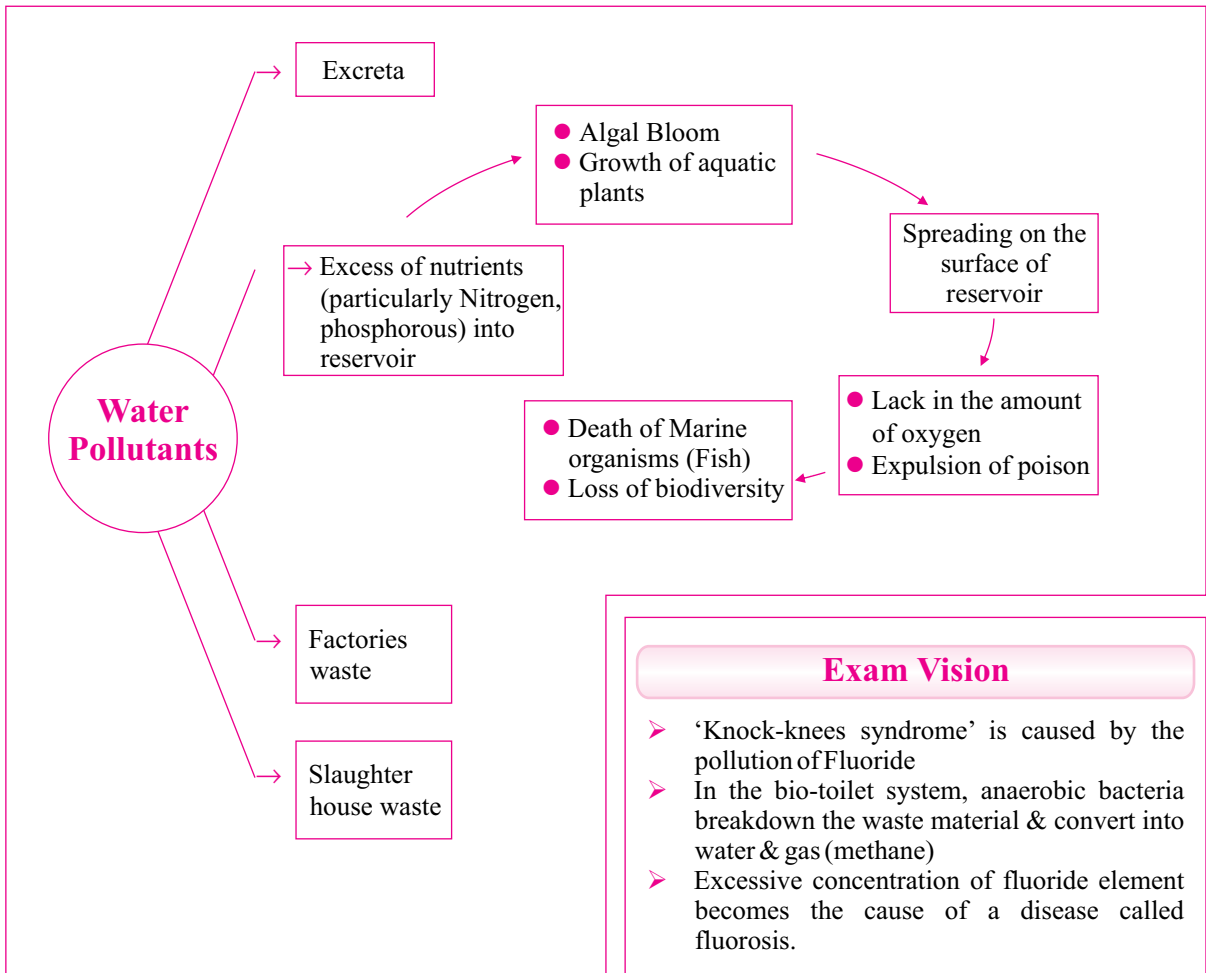
- The phenomenon of increase in the amount of both biotic & abiotic nutrients in water is called **-Eutrophication**
- The highest amount of Biochemical oxygen demand (BOD) is found in the Ganga River **Between Kanpur & Allahabad (Prayagraj)**
- There is abiotic pollutant polluting the ground water **-Arsenic**
- Considers to be a better absorption of arsenic **-Paddy Plants**



### Important Facts

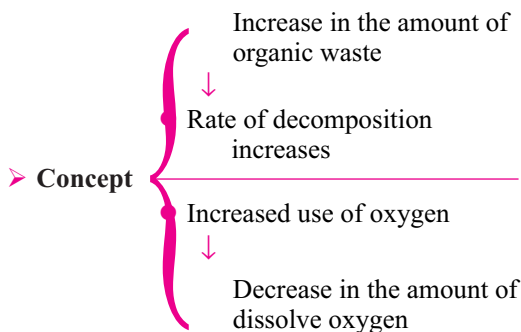






## BOD

- **Full Name** → Biological/Biochemical Oxygen Demand
- **Main Unit** → Measurement of water pollution
- **Increased amount** → Highly Polluted Water



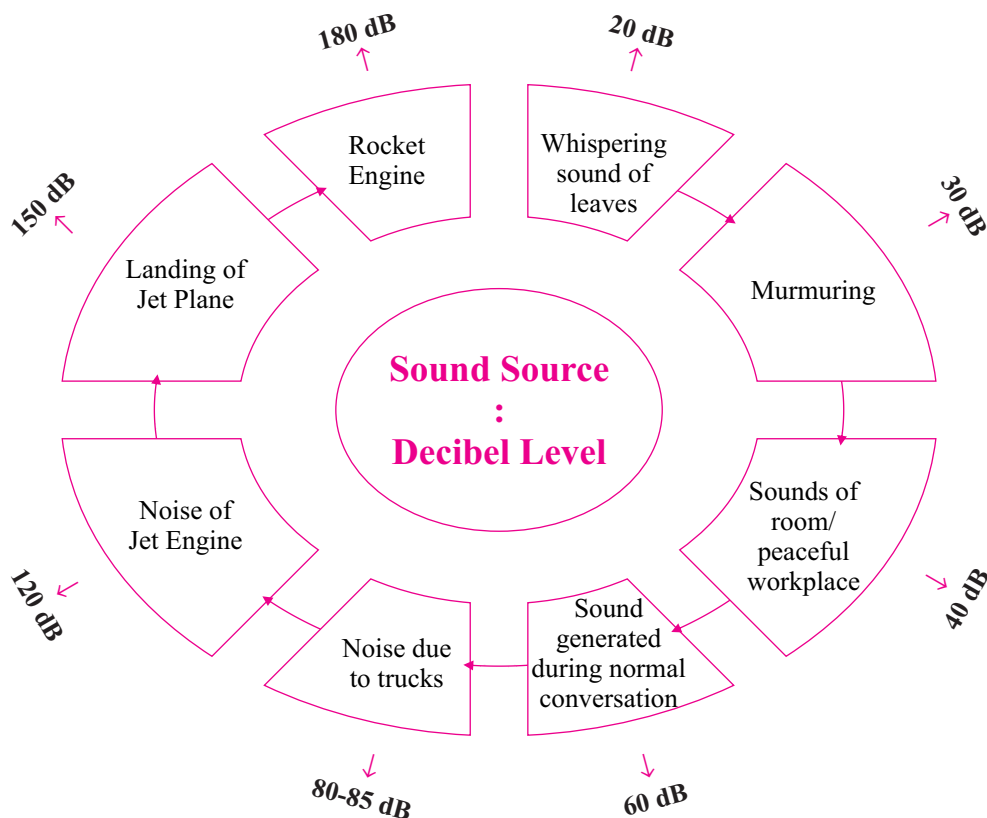
## Marine pollution

### IMO

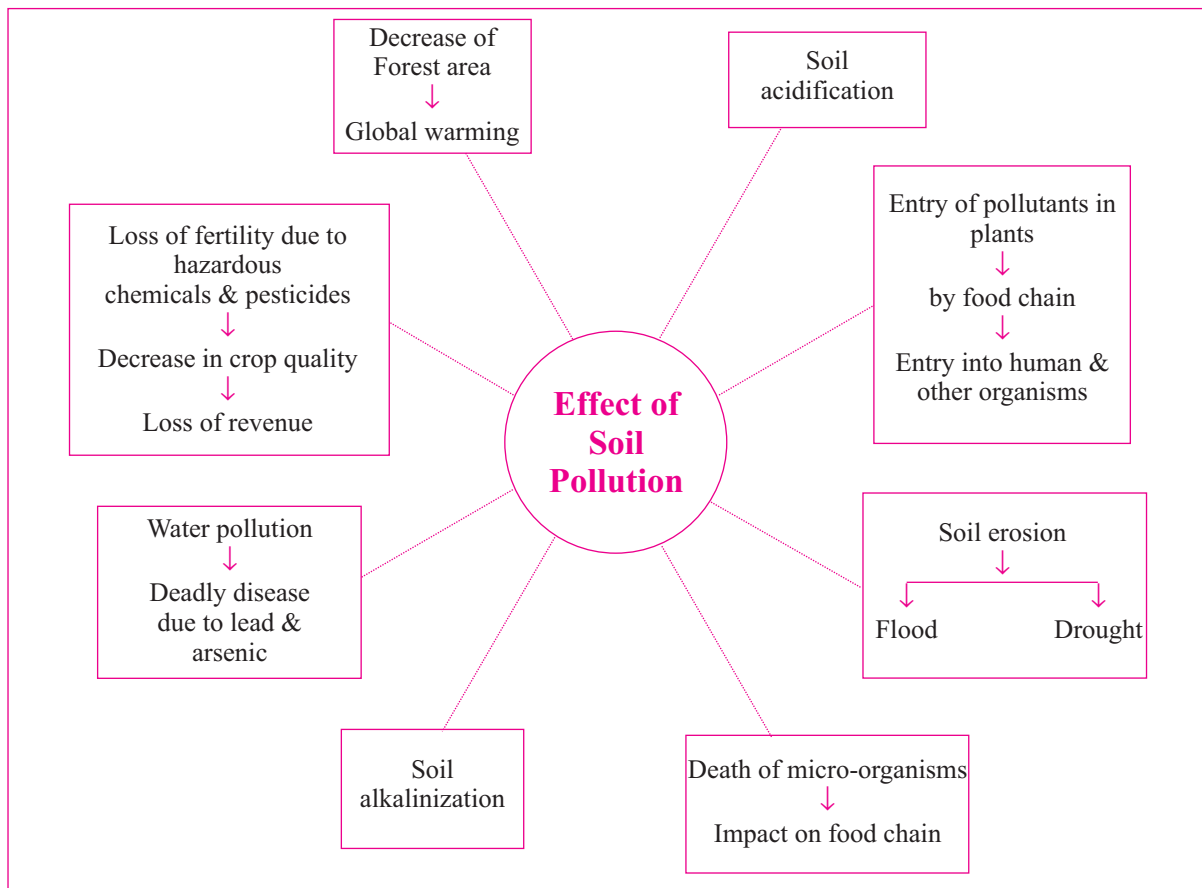
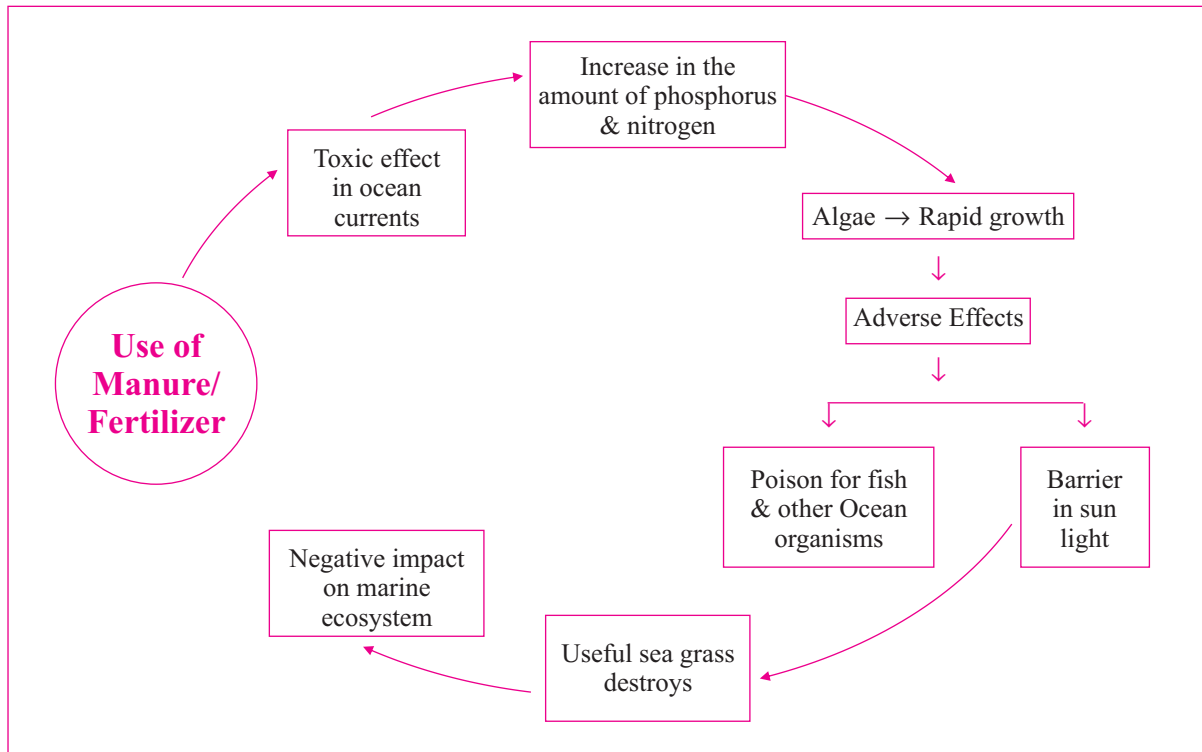
- **Establishment year** → 1948 [Geneva]
- **Full Name** → International Maritime Organization
- **Original Name was**  
→ Inter-Governmental Maritime Consultative organization (IMCO)
- **Headquarters** → London
- **Specialised Agency** → United Nations

## Noise Pollution

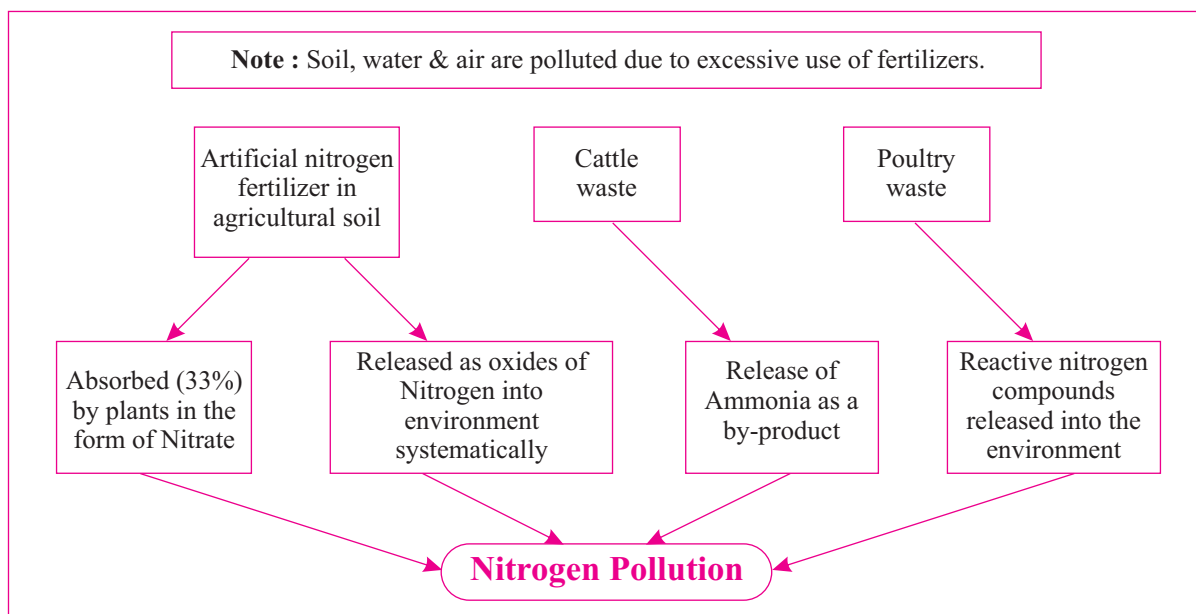
- The normal noise produced by an object is called **-Sound**
- The name for unpleasant sound **-Noise**
- Producing loud sound in the environment without anticipating its adverse effect is called **-Noise pollution**
- The sound is measured in **-Decibel (dB)**



## Soil Pollution



**Note :** Soil, water & air are polluted due to excessive use of fertilizers.



## Plastic Pollution

### Exam Vision

- Polythene is a polymer of ethylene [ $C_2H_4$ ]
- Plastic bag is a thermoplastic, which is obtained **-By Polymerization of ethylene**
- Plastic, iron, lead come under the category of Non biodegradable pollutants.

## Radioactive & Other Gaseous Pollution

### Important Facts

- The cause of Bhopal gas accident was **-The leakage of Methyl Isocyanate**
- Methyl Isocyanate gas is used **-In the production of carbonates pesticides**
- The date of the nuclear accident that occurred at the nuclear station in Chernobyl, Ukraine (the then soviet union) **- 26 April, 1986**
- The use of nuclear energy is often a causal factor of thermal pollution.

Damage tissues & limbs & obstructs their working system

Death due to anaemia & bleeding

**Somatic**

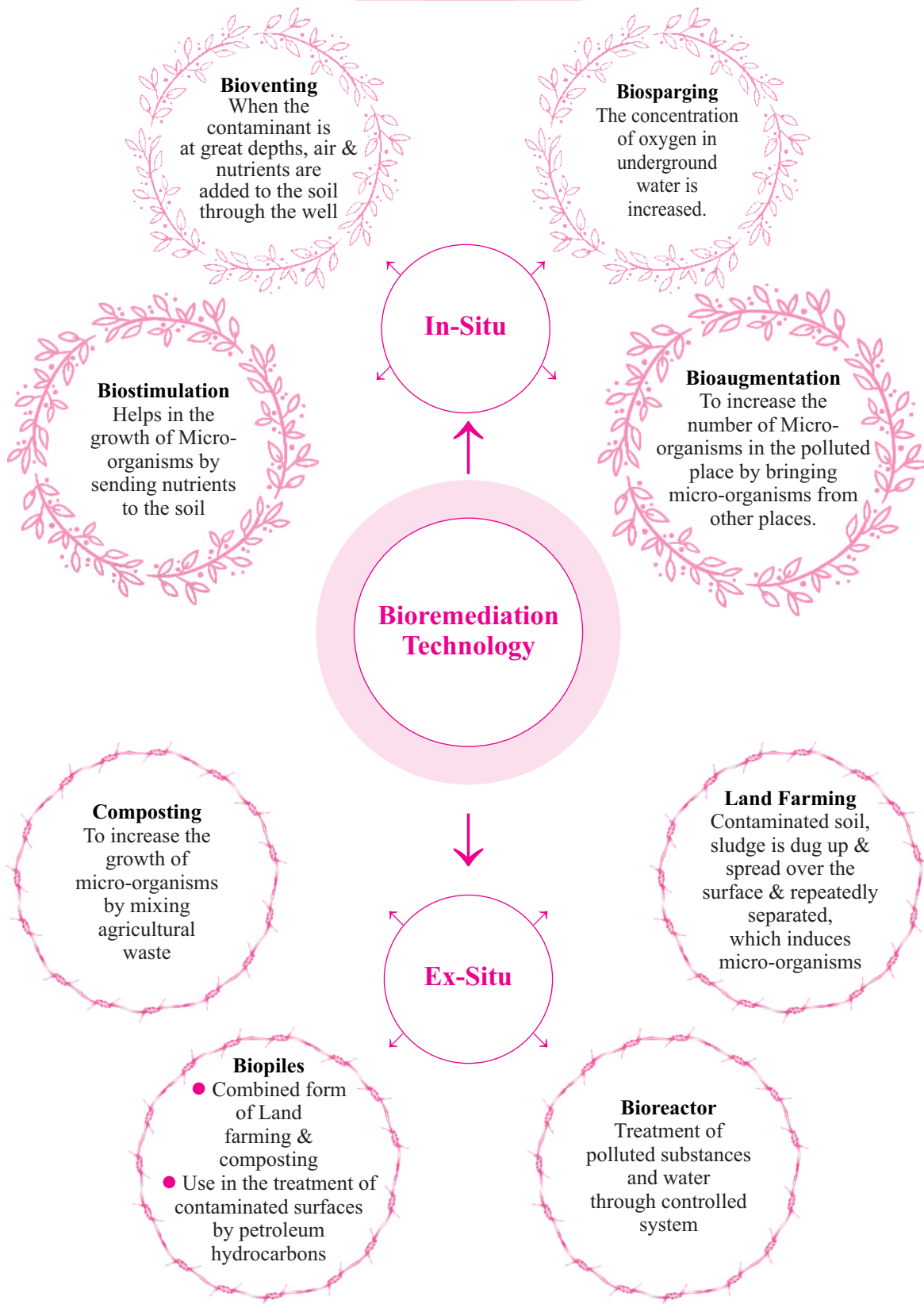
**Effect of Radioactive Pollution**

**Genetic**

Studies on Drosophila have shown that this increases the mutation rate

Massive effect on genetic properties

## Bio-Remediation

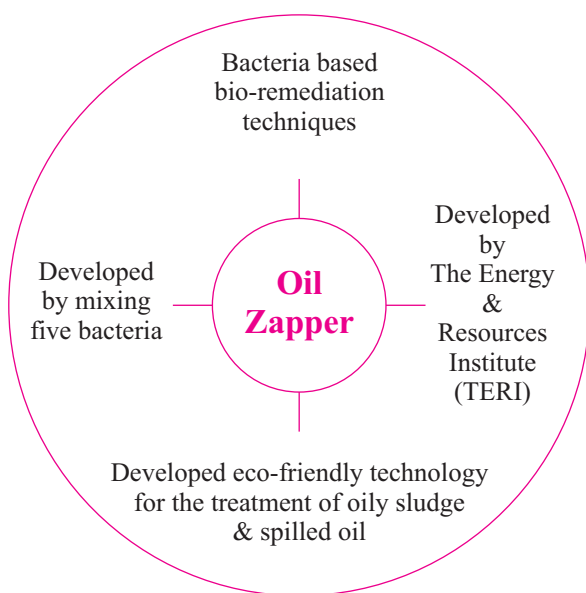


### Bio-Remediation

- **Definition** → A process of detoxification of environment through the use of microbial organisms  
↓  
Bio-Remediation
- **Technique** → To clean up pollution by enhancing the biodegradation process that occurs in nature
- **Uses** → In cleaning surface water, ground water & soil  
In the restoration of ecosystem

### Types

- **In-Situ Bioremediation** → Bioremediation in pollution affected areas
- **Ex-Situ Bioremediation** → Bioremediation by transporting the polluted substances to another place



### Pollution & Disease

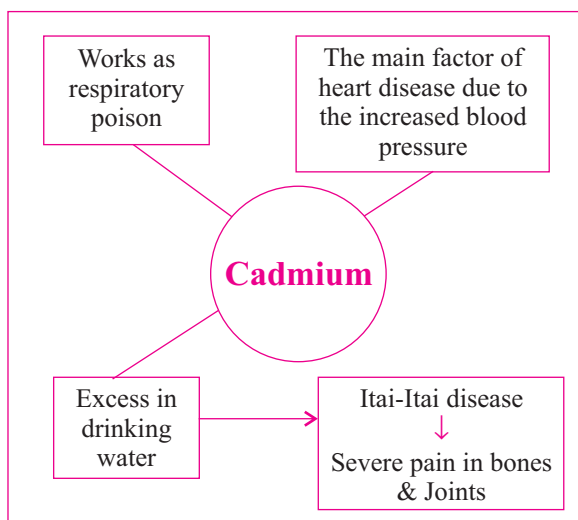
#### Pollutants

Mercury  
Cadmium  
Nitrate Ion  
Fluoride Ion

#### Related Disease

Minamata  
Itai-Itai  
Blue-Baby syndrome  
Fluorosis (Dental disease)

### Pollution & Disease



### Mercury (Hg)

- Consumption of Mercury affected water  
↓

Cause of minamata disease

- **Conversion**  
↓

Mercury Mixture present in waste water  
Microbial Reaction  
↓

Methyl mercury (Toxic matter)  
↓

- **Methyl Mercury**  
↓

Adverse Effects

- Deafness
- Blurred eyes
- Mental Imbalance
- Senselessness in lips, tongue & many other organs.



### Aflatoxin

- Mainly caused by *Aspergillus flavus* (Fungus)
- Carcinogenic
- Cause of liver cancer
- Low molecular weight compound

### POPs

- Full Name - Persistent Organic Pollutants
- Organic compound resistant to degradation in the environment
- Everlasting organic pollutants
- Transmission from one place to another (Through air, water, land & food)
- Ability to accumulate in human & animal tissues

### Air Pollutants

### Affected Organs

Asbestos dust	Lungs
Lead	Central Nervous system (CNS)
Mercury	Stomach
Carbon monoxide	Blood vessels

### Pollutants

### Effects

Carbon monoxide	Damage of Heart
Oxides of Nitrogen	Cancer
Dust particle	Respiratory Disease
Lead (Pb)	Central Nervous system, human brain

### Pollution Miscellaneous

#### Important Facts

- The size of the respiratory microscopic particles floating in the air is  
-About 2.5 microns
- commonly used as an adulterant for mustard seeds  
-Argemone seeds
- Disease caused by prolonged exposure to an environment surrounded by asbestos fibers  
-Asbestosis
- It is used to burn the garbage  
-Incinerators
- Emission as a result of coal combustion in thermal power plant, are  
- Carbon dioxide, Nitrogen, Oxides of sulphur etc.

### Water Conservation

#### Exam Vision

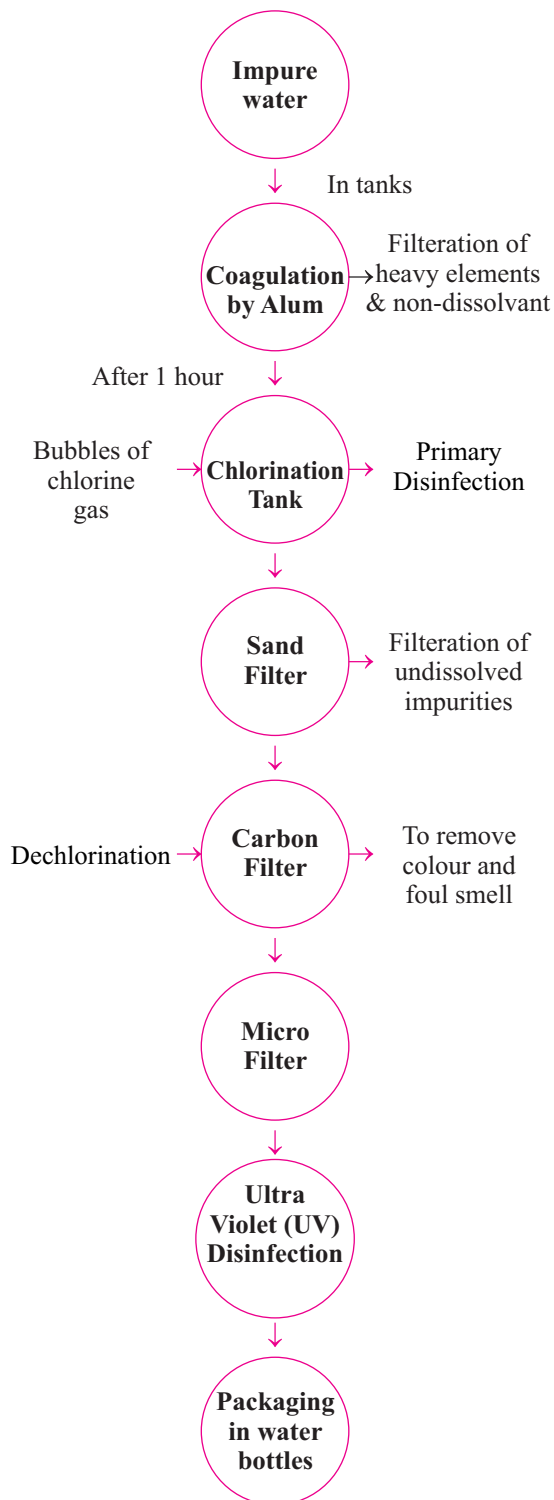
- World Water Day is celebrated every year  
- On 22 March
- The first world water day was celebrated  
- On 22 March 1993
- A programme called UN-water is being run  
- Since 2003
- The popular name of Rajendra Singh, the chairman of Tarun Bharat Sangh (an NGO) is  
- Waterman of India
- **Note :** In 1992, United Nations Conference on Environment and Development (UNCED) held in Rio-de-Janeiro, the decision was taken to celebrate an International Day of Clean Water.

#### Other Related Facts

- The national lake conservation project was launched as a centrally sponsored scheme by the Union Ministry of Environment, Forest & Climate Change  
- In June, 2001
- The name of new scheme created in February 2013 by merging two erstwhile schemes viz. National Lake Conservation Plan and National Wetlands Conservation Programme.  
- National Plan for Conservation of Aquatic Ecosystems
- **Note :** The leaves of plants found in the desert are often modified into spike to prevent water loss.

## Water Pollution & Prevention

### Process followed in the packaging of pure mineral water bottles



## Main goals of National Water Mission

Promotion of basin level integrated water resources management

Comprehensive water data base in public domain

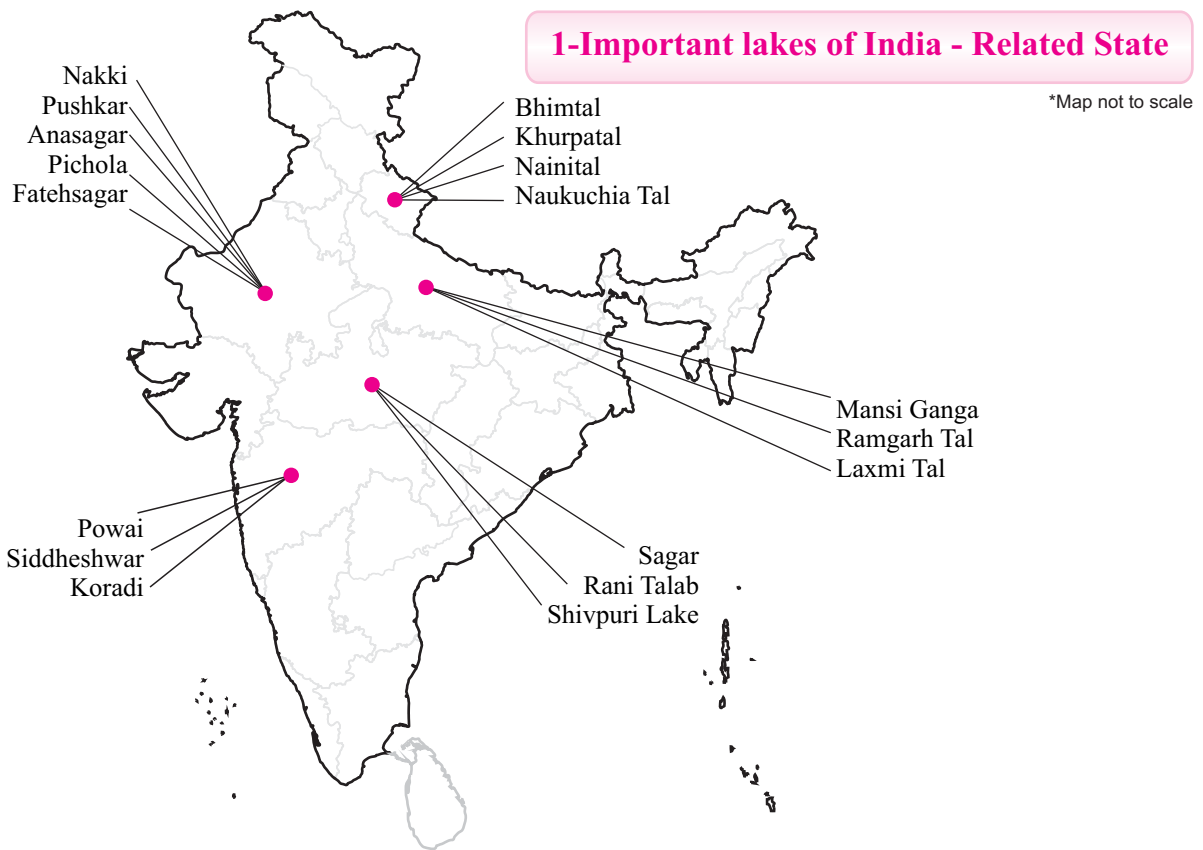
Increasing water use efficiency by 20%

Focused attention to vulnerable areas including over exploited areas

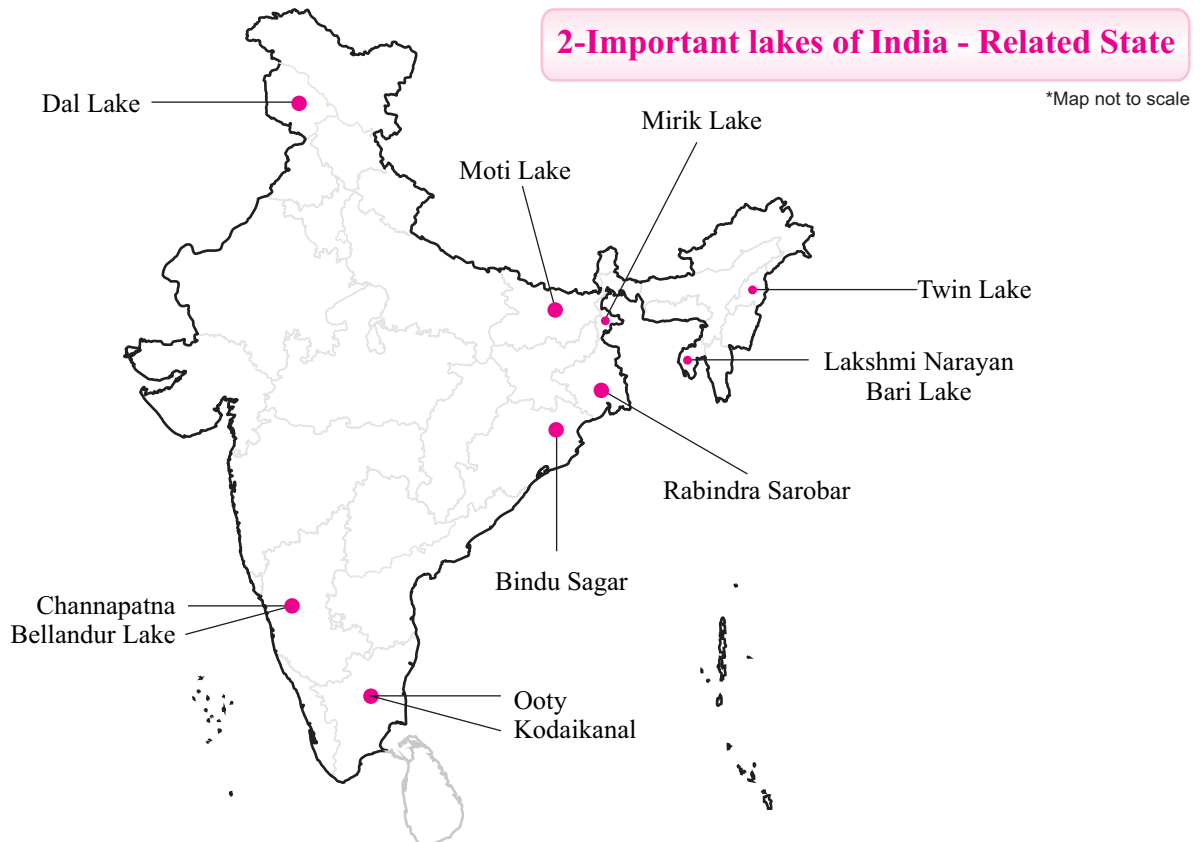
Promotion of citizen and state actions for water conservation, augmentation and preservation.

### Exam Vision

- Chloramines and Chlorine dioxide are used to-  
**Disinfect Water**
- The substance which is used to sterilize drinking water  
**Chlorine Gas and Bleaching Power**
- Water  
(Prevention & Control of Pollution) cess act was implemented in  
- 1977
- **Note :** The type of ultraviolet radiation is electromagnetic radiation  
In water purification method.

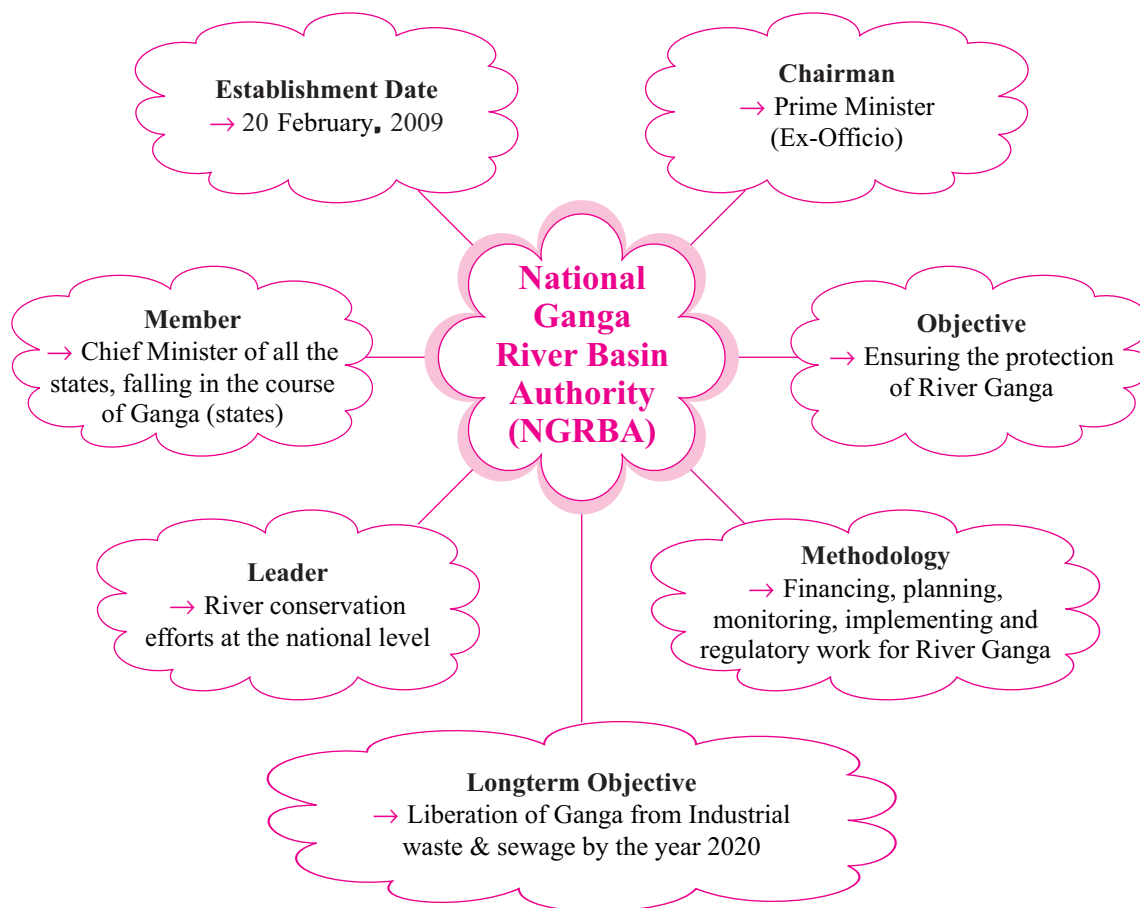


**Note :** Indicated points indicate the respective state & not the actual location



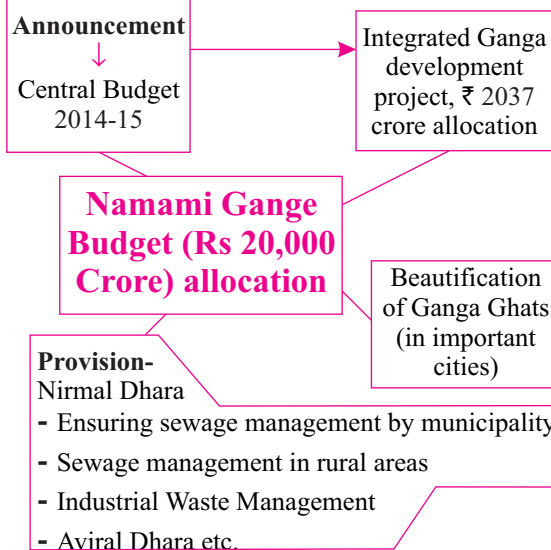
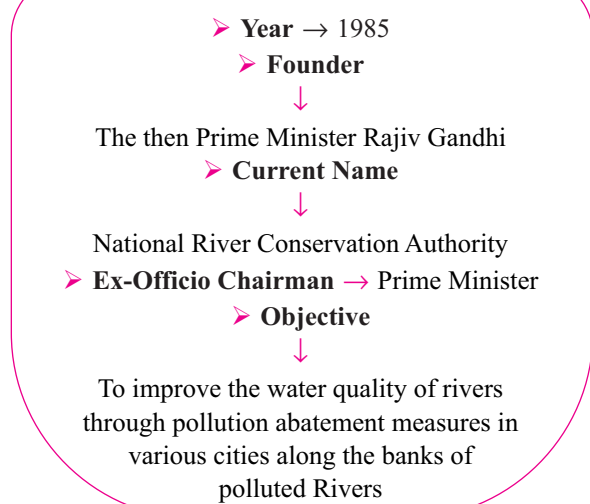
## Ganga Conservation

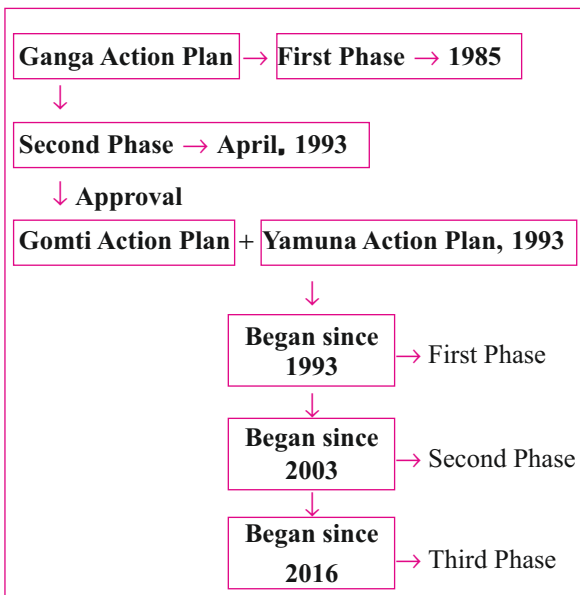
### National Ganga River Basin Authority (NGRBA)



**Free Ganga** → From untreated sewage water and industrial waste by the year 2020

### Central Ganga Authority



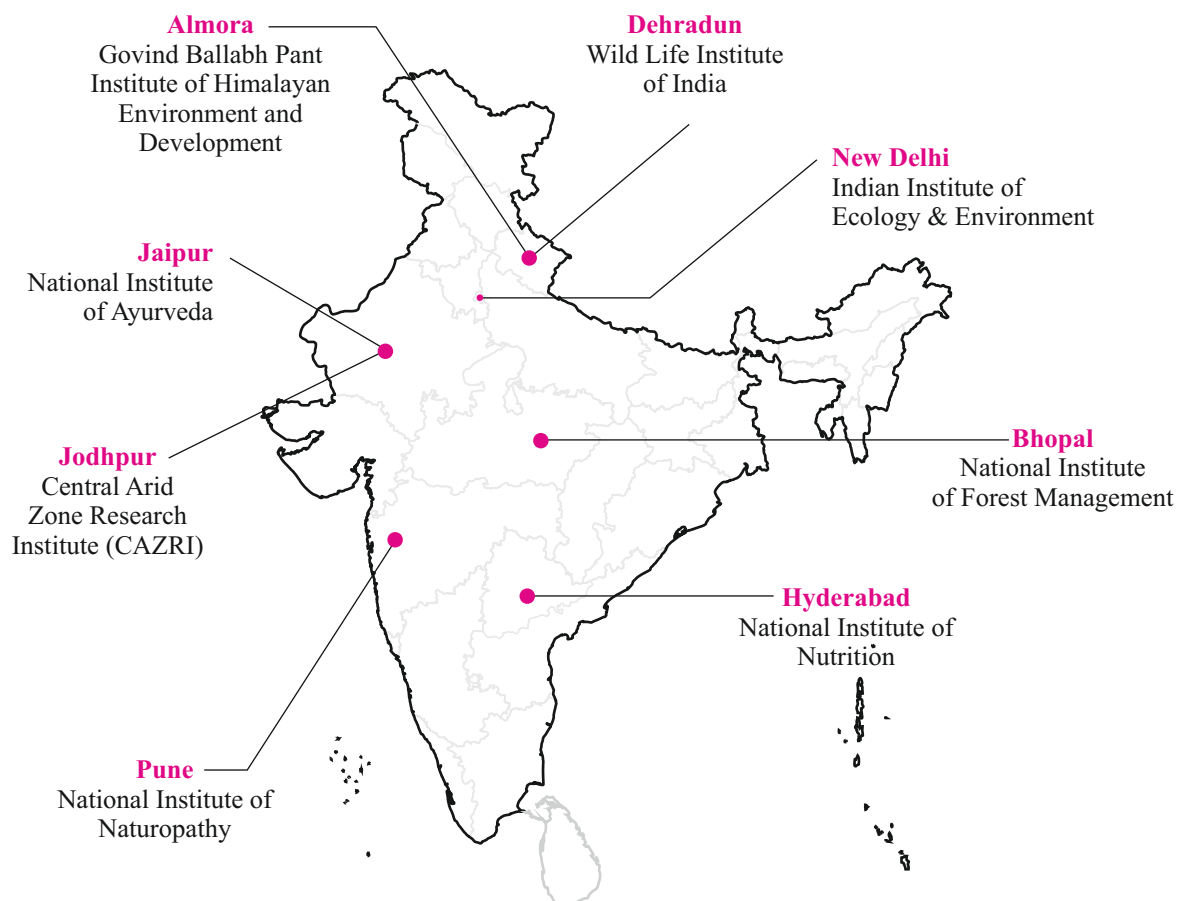


### Various Facts

- The first Bio-Technology Park in Uttar Pradesh was established in **-Lucknow**
- The causes of the origin of Tsunami is **-Earthquake occurring below the Sea**
- The gas which is used in filling balloons for meteorological observations, is **-Helium**
- There is a famous place named Graveyard of Dinosaurs. It is **-Montana [America]**
- The Indian Agricultural scientist who has been given the title of 'father of economic ecology' by the United Nations Environment Programme (UNEP) **-M.S. Swaminathan**

### Important Organizations & Institutions of India - Related State

\*Map not to scale



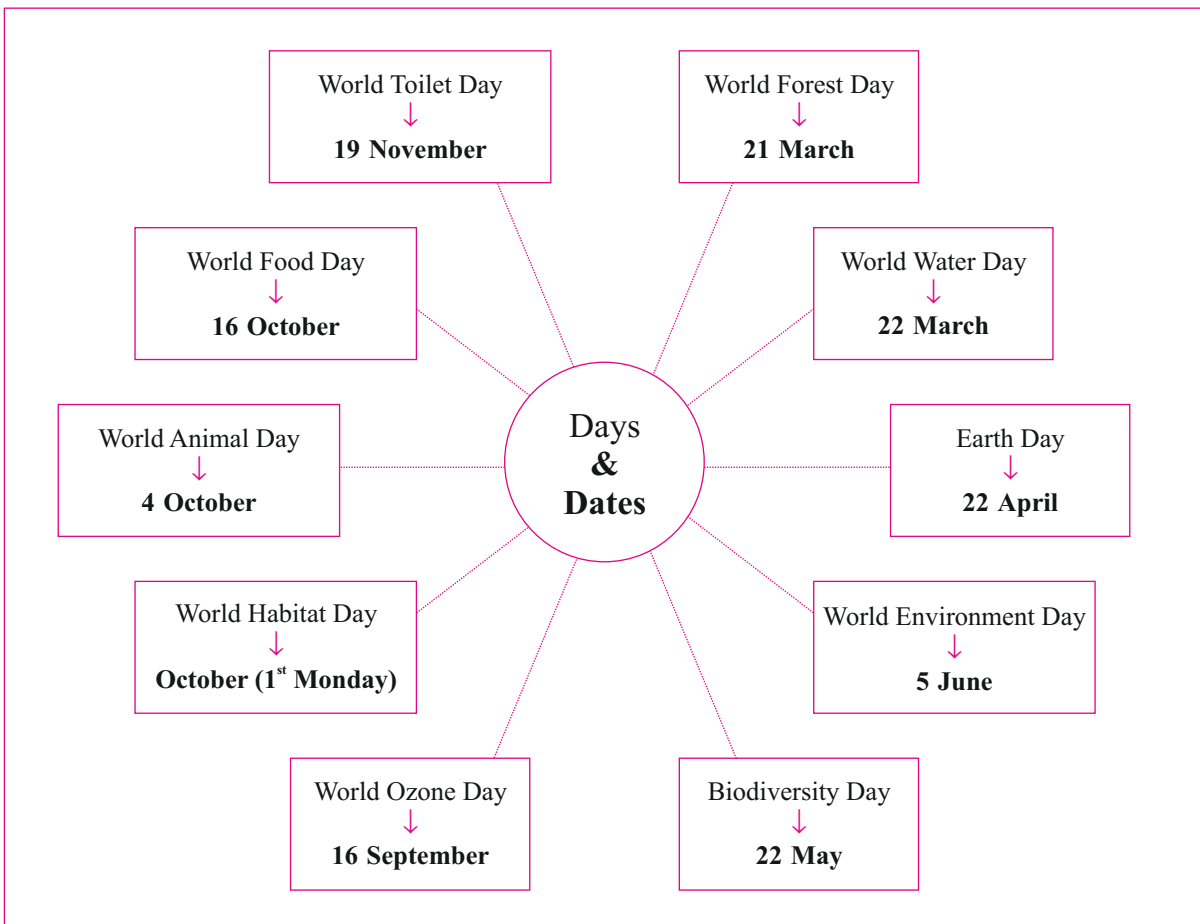
**Note :** Indicated points indicate the respective state not the actual place.

Place	Located Institution
Antarctica	India's first research center (Dakshin Gangotri)
	India's second research center (Maitri)
	India's third research center (Bharati)

Day	Theme
World Wetlands Day 2021	Wetlands & water
World Environment Day 2021	Ecosystem
World Water Day 2021	Valuing water
World Wildlife Day 2021	Forests & livelihoods: sustaining people & planet
World Toilet Day 2020	Sustainable sanitation & climate change
World Toilet Day 2021	Valuing toilets

## Various Awards

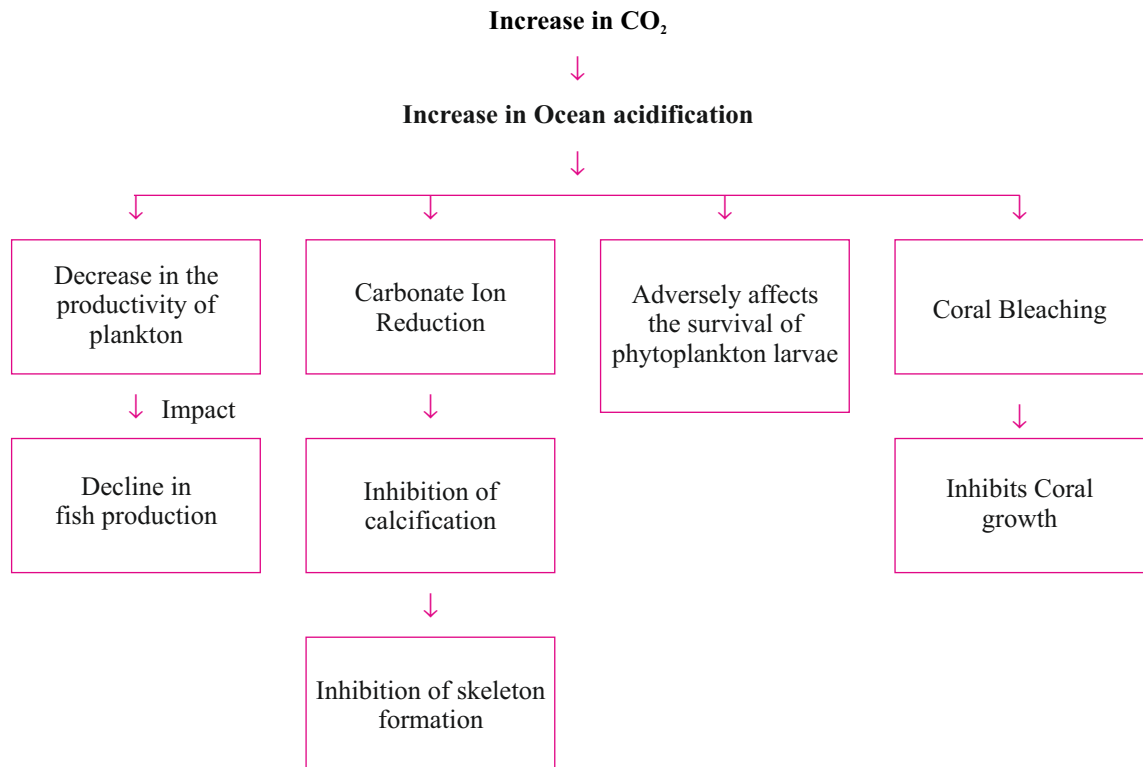
Awards	Related Fields
<b>Indira Gandhi Paryavaran Puraskar</b>	It is awarded to individuals & organizations that have made a significant & measurable contribution in the field of Environment Protection & Improvement
<b>Tyler Prize</b>	For remarkable contribution in the field of Environment Protection & Ecology
<b>Borlaug Award</b>	In the field of agriculture & environment
<b>Rajiv Gandhi Paryavaran Puraskar</b>	Clean technology & development
<b>Global 500</b>	For the outstanding achievement in environment protection





## Miscellaneous

### Adverse Effects of Increased Ocean Acidification



### Exam Facts

- Paddy fields, coal mining, pet animals, wetlands & termites are the sources of  
- **Methane (CH<sub>4</sub>) gas**
- With the Impact of global warming, the frequency and intensity are increasing of  
- **Cyclones & Hurricanes**
- Changes in the orientation of the Earth's axis is a factor for climate change, it was hypothesized by  
- **Milutin Milan Kovitch**
- The United Nations Framework Convention on Climate Change (UNFCCC) is an international treaty that came into force in  
- **21 March 1994**
- The gas that is both harmful & beneficial earth  
- **Carbon dioxide**
- A suitable concentration of carbon dioxide that is considered for the natural balance of the atmosphere  
- **0.03 Percent**
- "Momentum for Change : Climate Neutral Now" This initiative has been launched by  
- **UNFCCC**

- Extremely brittle ecosystem that will be the first to be affected by global warming  
- **Arctic & Greenland Ice sheets**
- Climate Change Conference (CoP21) that was held in year 2015  
- **In Paris**

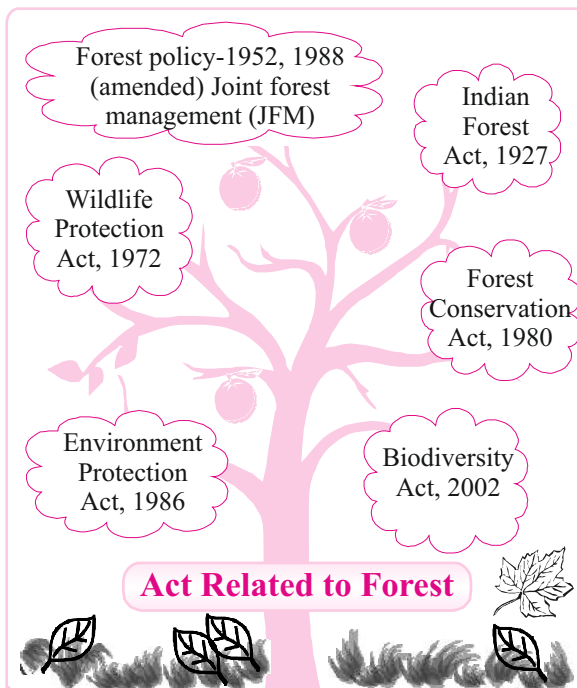


- The country which is known as carbon negative country in the world is - **Bhutan**

### Exam Facts

- The effect of greenhouse gases was conceptualized by  
- **Joseph Fourier**
- Examples of green house gases are  
- **Water Vapour, Carbon Dioxide, Methane, Nitrous Oxide, Ozone, CFC etc.**

Places	Institutions/Departments
Dehradun	Forest Survey of India
Jodhpur	Arid Forest Research Institute
Bangalore	Institute of Wood Science & Technology
Jorhat	Rain Forest Research Institute
Kolkata	Botanical Survey of India
Coimbatore	Institute of Forest Genetics & Tree breeding (IFGTB)
New Delhi	National Bureau of Plant Genetic resources
Nagpur	National Environmental Engineering Research Institute (NEERI)
Dehradun	Forest Research Institute



### Exam Vision

Word	Related Person
Green Development	W.M. Adams
Explorer of natural farming	Masanobu Fukuoka
Ecosystem	Tansley
Ecological Niche	Grinnell
Greenhouse gas effect	Joseph Fourier
Ecology	Earnest Haeckel
Biodiversity	Raymond F. Dasmann
Biosphere Reserves	Eduard Suess

### Exam Fact

- The government of India has so far established biosphere reserve **-18**
- It is located in Lakhimpur Kheri district of Uttar Pradesh **-Dudhwa National Park**
- Salim Ali National park is located **-in Jammu & Kashmir**
- Wular Lake is the largest fresh water lake in India. It is located in **-Jammu & Kashmir**
- Gir National Park is located in Junagarh, Gujarat. It is famous **-For the habitat of Asiatic Lion**

### Exam Facts

- The National Air Quality Index was released by the Ministry of Environment & Forest **- On 17 October, 2014**
- This Index serves to indicate the level of air pollution in urban areas **- In the form of one number- one colour- one description**
- The city where PM 2.5, PM 10, CO<sub>2</sub> & NO<sub>2</sub> are the reason for the increasing level of air pollution. The name of the city is **- Delhi**
- Climate & Clean Air Pollution that focuses mainly on pollutants, which are **- Methane, Black carbon, Hydrofluoro carbon**
- VAYU system for air coalition control was launched in **- Delhi**
- Air pollutants whose particle diameter is less than 2 microns cannot be removed from the atmosphere **- by Rain**
- Those air pollutants, which mix directly into the air from the source of the pollutant are called **- Primary Pollutants**
- CO, CO<sub>2</sub>, SO<sub>2</sub> are the examples of **- Primary pollutants**
- The first national park in the United States of America is **-Yellowstone National Park**